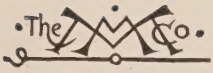
Digitized by the Internet Archive
in 2026

https://archive.org/details/stutteringlispin0000ewsc

STUTTERING, LISPING AND CORRECTION OF THE SPEECH OF THE DEAF



THE MACMILLAN COMPANY
NEW YORK · BOSTON · CHICAGO
DALLAS · SAN FRANCISCO

MACMILLAN & CO., LIMITED
LONDON · BOMBAY · CALCUTTA
MELBOURNE

THE MACMILLAN CO. OF CANADA, LTD.
TORONTO

STUTTERING, LISPING AND CORRECTION

OF THE

SPEECH OF THE DEAF

BY

E. W. SCRIPTURE, M. D., PH. D.

PROFESSOR OF EXPERIMENTAL PHONETICS, UNIVERSITY OF VIENNA; HONORARY LECTURER IN ENGLISH PHONETICS, KING'S COLLEGE, UNIVERSITY OF LONDON;

FORMERLY PROFESSOR OF EXPERIMENTAL PSYCHOLOGY, YALE UNIVERSITY; LATER ASSOCIATE IN PSYCHIATRY AND DIRECTOR OF THE RESEARCH LABORATORY OF NEUROLOGY, COLUMBIA UNIVERSITY; ALSO SPEECH PATHOLOGIST OF THE WEST END HOSPITAL, LONDON

AUTHOR OF ELEMENTS OF EXPERIMENTAL PHONETICS, THE STUDY OF SPEECH CURVES, SPEECH IN NERVOUS DISEASES, ETC.

RC
424
S4
1923

SECOND EDITION

New York
THE MACMILLAN COMPANY
1923

All rights reserved

PRINTED IN THE UNITED STATES OF AMERICA

COPYRIGHT, 1912 AND 1923
BY THE MACMILLAN COMPANY.

Set up and electrotyped. Published November, 1912
Second Edition revised, Published March, 1923.

STATE NORMAL SCHOOL LIBRARY

FERRIS PRINTING COMPANY
NEW YORK CITY

PREFACE TO THE FIRST EDITION

It would be difficult to find a group of people more neglected by medicine and pedagogy than that of stutterers and lispers. The stuttering children that encumber the schools are a source of merriment to their comrades, a torment to themselves, and an irritating distraction to the teacher. As they grow older, the stutterers suffer tortures and setbacks that only dauntlessness or desperation enable them to survive. The lispers that are so numerous in certain schools are a needless retardation to the classes.

In several European countries the state has established special opportunities for treating children with speech defects, but the matter has not received the full attention justified by its importance. In most medical faculties no place is accorded to speech defects; the same is true in schools of pedagogy. This was formerly justified on the ground that a scientific study of speech and its defects did not exist. In the last decade, however, the science of phonetics has extended itself to laboratory work and university teaching; moreover, speech clinics have been established in several of the foremost medical schools. The treatment of these defects thus stands upon an entirely new basis; namely, that of a carefully developed science of normal and pathological speech.

The views here expressed as to the nature of stuttering and lisping, and the methods of treatment proposed are the results of three lines of work. The first is a long experience in experimental psychology in the laboratory of the University of Leipzig and later in my own laboratory at Yale University. The second is an almost equally long specialization in experimental phonetics, beginning at Yale and continued for four years in Germany under a grant from the Carnegie Institution of Washington, D.C.; some of the results involved were first stated in my lectures at the University of Marburg (Germany). Finally, the treatment of thousands of patients in the speech department of the Vanderbilt Clinic and in private practice has developed the methods into forms that produce the maximum result with the minimum expenditure of time.

This book has been prepared to meet the needs of physicians and teachers; both are constantly confronted with the problem of what is to be done with a lisping or a stuttering child. By careful study of the symptoms as described here and by plentiful experience in a speech clinic a physician may expect within a reasonable time to develop the ability to make a correct diagnosis. A correct diagnosis by an expert should always be obtained before treatment is begun. The treatment of lisping proceeds along such clearly marked lines that the general practitioner and the regular teacher will have no difficulty in treating the individual cases that come to him in practice or in class. The results are always gratifying; the parent appreciates the seriousness of the defect, and the cure usually occurs without

great difficulty. The treatment of stuttering is much more difficult; it requires great skill and long experience. There should be at least one physician in each town who is able to help the numerous stutterers who must otherwise be neglected. One teacher in a school or in a group of schools may be trained as a special instructor.

I have to thank Professor H. Gutzmann, of the University of Berlin, for his kindness in specially modeling the plaster cast shown in Fig. 39, and Mr. Walter Robinson for the suggestion illustrated in Figs. 90, 91.

College of Physicians and Surgeons,
Columbia University, New York, 1912.

PREFACE TO THE SECOND EDITION

Ten years of further experience with speech defects confirm the views expressed in the first edition, that stuttering is not a defect of the nervous mechanism of speech and that its characteristics are not troubles of articulation. Records and careful studies have now been made covering most of the diseases and defects of the nerves, spinal cord and brain (published in Brain, Quarterly Journal of Medicine, Proc. Roy. Soc. Med., Vox, etc.). Nowhere do they show any resemblance to the records of stuttering. Stuttering is a disease of the mind, not a defect of the body.

Comparison of stutterers with persons having other mental peculiarities shows that the trouble is connected with the emotions. It is a psychoneurosis whose essential is the unconscious desire to avoid human society and whose mechanism consists in using ridiculous speech as a

means of attaining the desired isolation. The deeper cause varies from case to case.

As it is a mental trouble, its treatment must be entirely mental. The various exercises are all designed to be used as means of restoring confidence in speech. Mechanically or ignorantly performed exercises are injurious. Other strong mental influences are to be supplied by the personality of the one undertaking treatment and by a favourable adjustment of the surroundings.

Great success can often be achieved by the exercises alone used in proper surroundings by an inspired teacher. Many cases, however, cannot be cured without going to the roots of the disease. In all cases the time of treatment is greatly shortened by the radical method. This method consists in the proper use of psychanalysis.

When I formerly used the Freudian form of psychanalysis in combination with the treatment by exercises and change of surroundings, I found that in all cases the time required was reduced to a third or a quarter of that required without the analysis, and that I could cure many cases that I had had previously to give up in despair. Recently I have adopted certain modifications and somewhat improved methods of analysis by which it is possible to get more quickly at the stuttering complex. With these methods combined with exercises nearly every case of stuttering can be cured permanently in a few months. Any psychanalysis however, should be used only by a specialist after long training, in the hands of others it is directly injurious. Psychanalysis without exercises is useless for stuttering.

The problem of stuttering school-children has often been laid before me. I always answer that success is obtainable by exercises in the hands of a teacher whose

personality inspires the children with confidence and who recognizes that the benefit does not come from the exercises but from herself. Still greater success is obtainable if the teacher is able to interest herself in the individual children, to understand them, and to help straighten out their lives.

Part IV added to this edition is designed to introduce a much needed reform into the instruction of the deaf. Deaf persons who have received no instruction in lip-reading make a few sounds in a perfectly natural manner. The instruction in lip-reading produces in nearly every case an abnormal tone from the larynx. Moreover, even in the best cases really correct pronunciation is rarely, if ever, attained by the deaf who have never heard. Finally, the amount of labour that has to be expended in teaching phonation and enunciation is gigantic. With the methods hitherto employed it is not to be hoped that better results can ever be attained. The science of experimental phonetics, however, possesses methods that can be made of the utmost value to the deaf. In my work in 1912–13 in New York I was able to demonstrate that many faults of the deaf could be corrected completely and permanently by these methods. Special methods are treated in the four chapters of this part. Other suggestions may be obtained from Part II.

Now that the success and value of such methods have been proved, every deaf school must face the question whether it will introduce them and produce better results, or will reply, as one authority did, that the children have so much else to learn that they cannot be bothered about niceties of speech. When an institution or a teacher is possessed by "that tired feeling," it may be pointed out that the use of the new methods so greatly lessens the

labour of teaching lip-reading that the total amount of work is less than before.

The development of the work described in Part IV is due to the genius of Ethel Scripture, of revered memory.

The Chapters in Part IV first appeared in the *Volta Review*, 1913; they are published here, with some alterations, by permission of the editor.

E. W. Scripture.

12 Welbeck Street
London

Gatterburggasse 6
Vienna

CONTENTS

PAGE

PREFACE v

CONTENTS xi

LIST OF ILLUSTRATIONS xiii

PART I

STUTTERING

CHAPTER

I. DESCRIPTION. CAUSE 1

II. SYMPTOMS, FORMS, NATURE 10

III. DIAGNOSIS 42

IV. THERAPY 56

V. METHODS OF TREATMENT 74

PART II

LISPING

I. INTRODUCTION 111

II. NEGLIGENT LISPING 122

III. ORGANIC LISPING 162

IV. NEUROTIC LISPING 173

V. CLUTTERING 187

PART III

EXERCISES

SET

I. BREATHING 196

II. MELODY 194

SET PAGE
III. Flexibility 197
IV. Slowness 198
V. Smoothness 201
VI. Voice Quality 202
VII. Starting and Ending Sentences 205
VIII. Enunciation and Spelling 207
IX. Expression 208
X. Confidence 210
XI. Spontaneous Speech 216
XII. Thinking 217
XIII. Description and Relation 219
XIV. Telephoning 221
XV. Talking with People 222
XVI. Relaxation 224
XVII. Muscular Control 225
XVIII. Word Lists 228

PART IV

NEW METHODS OF CORRECTING THE SPEECH OF THE DEAF

I. The Organ Trainer 244
II. The Strobilion 252
III. Graphic Records of Speech 262
IV. Correction of Nasality 273
Plates 283
Index 287

LIST OF ILLUSTRATIONS

FIG.		PAGE
1.	Recording the movements of breathing by the graphic method	21
2.	Breath record during stuttering	23
3.	Recording the pressure of the lips by the graphic method	23
4.	Lip record of a stutterer's attempt to say the first letter in the word "Peter"	24
5.	Recording the movements of the tongue	24
6.	Record of a stutterer's cramps of the tongue in attempting to say "Tommy"	25
7.	Recording the mouth current	26
8.	Mouth record of "papa" spoken normally	27
9.	Mouth record of "papa" with blowy "p's" spoken by a stutterer	28
10.	Mouth record of "papa" with an inspiratory "p" spoken by a stutterer	28
11.	Mouth record of "sleepy" spoken normally	29
12.	Mouth record of "sleepy" spoken by a stutterer	30
13.	Mouth record of "stutter" spoken normally	30
14.	Mouth record of "stutter" spoken by a stutterer	31
15.	Mouth record of "Peter Piper's peppers" spoken by a stutterer	32
16.	Melody plot for "papa" spoken normally (Fig. 8)	33
17.	Melody plot for "papa" spoken by a stutterer (Fig. 9)	34
18.	Mouth record of "papa" in a case of spastic speech	50
19.	Mouth record of "papa" in a case of motor aphasia	51
20.	Mouth record of "papa" in a case of bulbar paralysis	53
21.	Scheme to illustrate the mechanism of stuttering	58

FIG. PAGE

22. Notes indicating how the phrase "How do you do?" is to be sung 75
23. Line indicating how the phrase "How do you do?" is to be sung according to the notes in Fig. 22 . . . 75
24. Line indicating how the normal voice should rise and fall in speaking the phrase "How do you do?" with a melody similar to that indicated in Fig. 21 . . . 76
25. Line indicating the monotony of the stutterer's voice in speaking the phrase "How do you do?" . . . 76
26. Mouth record showing the word "papa" as actually sung 77
27. Melody plot to Fig. 26 77
28. Octave twist in musical notation 78
29. Octave twist indicated by a line 78
30. Mouth record of "papa" spoken with the octave twist . 78
31. Melody plot to Fig. 30 79
32. Mouth record of "papa" spoken with an unsuccessful attempt at the octave twist 79
33. Melody plot to Fig. 32 80
34. Perfect closure of the glottis 81
35. Glottis during a breathy tone 81
36. Vowel curve with normal beginning and ending . . 82
37. Vowel curve with glottal catch at beginning and ending 82
38. Mouth record of the stutterer's correction of the inspiratory "p" in Fig. 10 89
39. Median section of the organs of enunciation and phonation 113
40. Artificial palate 114
41. Palatogram for the vowel "ee" 115
42. Candle flame indicator used for the mouth . . . 119
43. Tambour indicator used for the nose 120
44. Lip position for "f" and "v" 122
45. Lip position for "w" 123
46. Lip position for correcting "w" into "v" . . . 124

FIG. PAGE
47. Palatogram for forward "t" and "d" 125
48. Palatogram for backward "t" and "d" 125
49. Palatogram for "k" and "g" 125
50. Mouth diagram for "t" and "d" 125
51. Mouth diagram for "k" and "g" 125
52. Mouth record of "water" spoken normally . . . 126
53. Mouth record of "water" spoken by a lisper . . . 126
54. Palatogram for "s" and "z" 130
55. Palatogram for occluded "s" and "z" 130
56. Mouth diagram for "s" and "z" 131
57. Mouth diagram for occluded "s" and "z" . . . 131
58. Mouth record of "sun" spoken normally . . . 132
59. Mouth record of "sun" spoken by a lisper . . . 132
60. Tongue record for occluded "s" 132
61. Correcting occluded "s" and "z" 133
62. Making the interdental fricative 134
63. Mouth record of the word "Mitchell" 136
64. Mouth record of the word "nutshell" 136
65. Palatogram for "ch" and "j" 137
66. Mouth diagram for "ch" and "j" 138
67. Mouth diagram for "n" 139
68. Mouth diagram for "ng" 139
69. Palatogram for "sh" 140
70. Mouth diagram for "sh" 140
71. Palatogram for "th" 141
72. Mouth diagram for "th" 141
73. Mouth record of "thin" spoken normally . . . 142
74. Mouth record of "tin" spoken normally . . . 142
75. Mouth record of "thin" with occluded "th," by a lisper 143
76. Correcting occluded "th" 143
77. Mouth record of front rolled "r" by an American . 144
78. Palatogram for English "r" 145

FIG. PAGE
79. Mouth diagram for "r" 145
80. Mouth record of English "r" 145
81. Mouth record of uvula "r" by a Parisian . . . 146
82. Palatogram for "l" 146
83. Mouth diagram for "l" 146
84. Rod for pushing the tongue 147
85. Pushing the tongue into position for "r" . . . 147
86. Recording the nasal current and vibrations . . . 151
87. Nasal record of "sun" spoken normally . . . 152
88. Nasal record of "sun" with relaxed velum . . . 152
89. Tissue paper indicator 153
90. Velar hook 154
91. Velar hook in position 155
92. Mouth record of "dog" 156
93. Mouth record of "dok" 156
94. Mouth record of "dogk" 157
95. Mouth record of "apa" with the explosion of "p" well marked 158
96. Mouth record of "apa" with no explosion of "p" . 158
97. Hemiatrophy of the tongue 163
98. Mouth record of "so" spoken normally . . . 175
99. Mouth record of "so" in neurotic lisping . . . 175
100. Mouth record of "silk" spoken normally . . . 177
101. Mouth record of "silk" in neurotic lisping . . . 177
102. Mouth record of "shoe" in normal speech . . . 178
103. Mouth record of "shoe" in neurotic lisping . . . 179
104. Gas capsule 244
105. Gas capsule in use with revolving mirror 245
106. Flame figures for two tones an octave apart . . . 246
107. The organ trainer 253
108. The strobilion 253

FIG PAGE

109. The strobilion disc, illuminated by an intermittent flame, whose flashes make the middle ring appear to stand still 254

110. Strobilion exercises indicated on the strobilion staff . 260

111. Time line, each vibration measures 1/100th of a second 263

112. Record of "potatoe," in phonetic notation (poteto) . 264

113. Records of "she" 266

114. Records of "too much" 268

115. Records of "do" 270

116. Tambour indicator 274

117. Making mouth and nose records 276

118. Nose and mouth record of "thinking" 277

119. Nose and mouth records of "so" 279

120. Nose and mouth records of "spark" 280

Plates I, II, III. Mouth diagrams for typical English sounds 283

Plate IV. Palatograms for typical English sounds . . . 286

STUTTERING, LISPING AND CORRECTION OF THE SPEECH OF THE DEAF

STUTTERING, LISPING AND CORRECTION OF THE SPEECH OF THE DEAF

PART I

STUTTERING

CHAPTER I

DESCRIPTION. CAUSE

As "stutterers" we designate individuals showing certain peculiarities of speech. One stutterer, for example, will make spasmodic contractions of the lips, tongue, etc., whereby a word like "berry" will be pronounced "b-b-b-b-berry." Another will open his mouth wide and produce an "a-a-a-a-" before he can say a word. Another will find himself suddenly unable to speak at all at the beginning or in the middle of something he wants to say. Still others are quite unable to speak certain words. One young man could never speak the name of his town and was obliged always to buy his railway ticket to the next town beyond. One lady would find herself at a ticket office suddenly speechless and unable to

tell what ticket she wanted while an impatient crowd of commuters gathered behind her.

Stuttering is a serious detriment to the person's welfare. One refined stuttering girl of sixteen was studying typewriting and stenography, not realizing that no office would tolerate a secretary who could not answer when suddenly spoken to or who could not use the telephone. But what was she to do for a living? Even on the lower level of a shop girl she would be impossible. The examiners of immigrants at New York City often refuse admission to stutterers on the ground that they are liable to be unable to make a living and likely to become public charges. A law student felt that on account of his stuttering he must relinquish his ambitions and confine himself to uncongenial work. At the best, the stutterer's social life is limited and abnormal. He often retires from social intercourse as much as possible and becomes more or less eccentric. One boy grew up in such isolation that his oddities made him appear feeble-minded, although he was not mentally defective. Excessive stuttering has been made the basis of divorce for cruelty.

To most people stutterers seem comical. They

are the butts of innumerable anecdotes in the newspapers and on the stage. The stutterer learns that people regard him as a kind of involuntary clown and that his family and friends are ashamed of him.

Few persons realize how terrible life becomes to a stutterer. A normal person may get a mild idea of it by supposing that every time before he speaks he is obliged to wink one eye or to open his mouth and yawn; the feeling of embarrassment and shame would soon overpower him. A stutterer is worse off; every time he tries to speak he is obliged to make a fool of himself in such a way as to make other people want to laugh at him. One religious but stuttering lady finally demanded to be "cured or chloroformed." One boy often threw himself on the floor, begging his mother to tell him how to die. Another boy asked for a letter to his father, telling him to keep the other children from laughing at him. Many stutterers become so sensitive that they imagine everybody is constantly making fun of them. The life of a stutterer is usually so full of sorrow that it can hardly be said to be worth living.

At school the child is tormented by his fellow mates. He is usually a trial to the busy teacher

and a hindrance to the progress of the class. He is often excused from oral recitation, but just as often the teacher constantly corrects him or ridicules him. Sometimes it happens that the child has a cramp that keeps him from starting an answer for a moment, but does not show itself otherwise, such a stutterer prefers to be thought lazy or stupid rather than reveal the true nature of his trouble.

Even at home the stutterer is misunderstood and often tortured from the best motives. He is frequently reproved or scolded as an inattentive or bad boy because he "could speak properly if he would only try." Many a parent is often sure that this is so because the child will speak properly when reminded to do so. The truth is that no human being can always think of how he is to speak before he speaks; the stutterer simply cannot stop stuttering of his own accord.

Stuttering is, indeed, a serious disease. It is not as undesirable as mania or cancer, but most people would prefer to have typhoid or pneumonia for the simple reason that with these diseases a person either dies or recovers, whereas stuttering is a lifelong torture.

A very great injustice to the stutterer is the widely spread notion that stuttering is a bad habit which is to be corrected by reproof, scolding and punishment. The treatment is supposed to consist in a kind of schooling, the result depending on the diligence of the pupil. Lack of progress is attributed to inattention or laziness. Parents, friends, and teachers are always alert to test the patient's progress. Of course, all this simply makes the stutterer worse, turns a mild case into a severe one, and drives many a sufferer to despair. Stuttering is a disease; it can be properly treated only on the principles of any other disease. Just as with all other diseases, some cases get well spontaneously and some get well no matter how they are treated; yet so few recover permanently under the treatments in vogue that there is a widespread opinion that stuttering is incurable.

The most frequent cause of stuttering is a nervous shock. Ghosts and other practical jokes, and, with very small children, such terrifying experiences as are found at amusement resorts (scenic railways, fire scenes, etc.) are often the causes of fright from which the child never recovers. Severe falls are just

as often the sources of the mental shock. Surgical operations (for cataract, adenoids, etc.) are occasionally the sources of stuttering. The cause of stuttering in all these cases is evidently the intense fear involved in the shock. In some cases the fear has developed gradually. A boy of twelve relates that at the age of seven, on several occasions in the daylight he thought he heard footsteps of some one following him in the hall, whereas the noise was of his own footsteps; thereafter he began to stutter. He is still afraid to walk in the dark, to be alone or to go to sleep in the dark. A young man of seventeen relates that he began to stutter in reading at seven years because he knew that he would make mistakes before the class and become nervous about it.

Most of the stutterers from shock show a general condition of nervous excitability in which the predominant element is an abnormal state of expectancy toward persons and events. The patient is often on the alert for what is going to happen. He watches other people and replies before they half finish their remarks; or he is timid to such a degree that conversation is painful. The same condition of general overanxiety I have found in patients who do not stutter.

It is a typical psychoneurosis, that may, perhaps, be appropriately called the "general anxiety neurosis." In addition to the kinds of nervous shock mentioned above, it is possible that the cause of the general anxiety neurosis may lie in shocks of various kinds occurring in infancy and childhood. This "general anxiety neurosis" differs from the anxiety neurosis of Freud in several ways. In the former the anxiety (or fear) is present at all times; it is ready to attach itself to any thought or occurrence for which a fairly valid reason can be found; the patient knows that he is overanxious, but his anxiety always seems fully justified at the moment. In the latter the anxiety attaches itself to one particular thing, for example, the patient cannot cross an open space because he is afraid to do so; although the fear is irresistible, the patient usually realizes fully that it is absurd.

A very frequent cause of stuttering is mental contagion by intentional or unintentional imitation. A boy thinks it fun to mock a stutterer, and ultimately finds that he himself cannot stop stuttering. A stuttering parent nearly always has one or more stuttering children. Even when the parent had stopped stuttering in youth, there are usually

enough traces left in his speech (*e.g.* hard voice) to start the child stuttering. Stuttering has been known to develop in a child from playing with a deaf-mute who talked with difficulty.

Stuttering frequently appears after whooping cough, also after scarlet fever, measles, influenza, intestinal troubles, scrofula, rickets, etc. The cause seems to lie in the condition of exhaustion.

One of my cases showed symptoms of spastic infantile paralysis (spasticity of the legs, weakness and athetosis of the hands, weakness of the muscles of speech) with history of difficult birth. The difficulty in using the muscles of speech may be assigned as the cause of the stuttering.

A neuropathic disposition or a condition of nervous exhaustion is present in nearly all cases of stuttering.

The first suggestion for prophylaxis is that parents and nurses are to avoid stories and scenes that frighten children. Nervous children should receive tonic treatment, especially open-air life. If one child in a family begins to stutter, he should be cured immediately in order to save the others. A stuttering child in school is a danger to his fellows.

The statistics show from 1 to 2 per cent of stutterers among school children. A smaller percentage in the lower classes becomes trebled in the higher ones. Marked increases are found at the periods of second dentition and puberty. The relative frequency among boys and girls ranges from 2:1 to 9:1.

CHAPTER II

SYMPTOMS, FORMS, NATURE

The most striking symptoms are cramps or spasms of the muscles connected with speech.

Abdominal cramps are nearly always present. The entire abdomen may suddenly become rigid, or it may make irregular contractions. In one case the wall just over the navel was drawn into a deep cuplike cavity. The diaphragm, as seen by the X-rays, may be suddenly fixed or may move downward in spasms. The spasms sometimes propel the abdominal wall outward in jerks. Often both abdominal muscles and diaphragm will become perfectly rigid and immovable. These contractions produce irregular interruptions or expulsions of the breath instead of the steady current necessary for proper speech, or they give no breath at all and render the patient speechless. One patient of mine often became suddenly speechless in this way for ten to fifteen seconds at a time. A frequent phe-

nomenon is the expulsion of the breath just before speaking. The most frequent case is that of continual irregularities of breathing during actual speech.

Laryngeal cramps are a never-failing symptom of stuttering. The muscles in and around the larynx become tense and fixed. The tone from the larynx is monotonous, hard, and often husky. It is not unusual to find a patient who never has any symptom of stuttering in the presence of the physician except the monotonous laryngeal tone. I have never seen a stutterer without this symptom.

Cramps and spasms of the muscles of enunciation are the ones most apparent to the observer. The lips may be pressed tightly together for a short or a long time when the patient tries to say "p" or "b." In other cases they will open and shut, producing a series of "p"s or "b"s instead of one. The tongue may be pressed so tightly against the palate that the "t" or the "d" is two, three, or ten times too long. All the sounds may be similarly affected.

Less frequent but more striking are the contractions of muscles not ordinarily used in speech. One

patient will twist his head whenever he stutters badly, another will screw up one eye, another will contort his whole body, etc. One patient had "pains that did not hurt" in her legs and arms while speaking. One boy of seven made horrible grimaces and stuck his tongue like a thick stick far out between his lips. One girl of twenty-two would spend one to two minutes in grunting like a pig and whimpering like a dog after which she would say the word or sentence with ease.

All the muscles involved in speech are brought into a condition of greater or less over-tension whenever the stutterer begins to speak, although there may be no visible cramps or spasms or any stuttering in the popular sense. Over-tension is thus a cardinal system of stuttering. The over-tension is psychic (mental) and not neural; it appears only when the person intends to speak. There is no resemblance to the hypertension in nerve diseases.

The trained ear readily detects the hard tone of the voice which results from laryngeal over-tension. The expert can thus tell from the first sound that

the patient makes whether he has started his sentence correctly or has begun with the stuttering tone that will cause him to stumble before he finishes.

Another kind of symptom occurs in the "er," "well," etc., that the stutterer uses to get started. Sometimes this "starter" is an inarticulate but complicated grunt. Sometimes the starter is repeated several times; one young lady would regularly repeat "why" ten to fifteen times before she could get out the first word of what she wanted to say, and even then she sometimes failed and had to begin over again. Often the patient has to make severe contortions of the face or the head or the body before he can begin.

An almost constant symptom is excessive rapidity of speech. In some cases this is to be attributed to the desire of the stutterer to get his words out before he is caught or before any one can interrupt him. In most cases it is the expression of nervous anxiety.

A never failing symptom is the patient's lack of confidence in his ability to speak correctly. In some cases the mere thought "Will I be able to say that word?" is sufficient to make it absolutely impossible for the person to say it. The stutterer

always lives with the fear that his speech may "go back on him." Many a one is always thinking a few words ahead of what he is saying, being on the lookout for some word he thinks he cannot say. When such a word is coming, he avoids it by selecting another that will serve just as well. One patient practically passed his life in always avoiding words; this mental work, being added to that of a normal man, kept him in a condition of nervous prostration.

The fear of being ridiculous is nearly always present. The person does not want to "make a fool of himself." He therefore avoids reciting in school, he refuses invitations to social affairs, he would rather live with his father's employees in a mine than go to college, he shuts himself up with a servant and becomes a queer-mannered hermit, etc.

A condition of mental flurry is usually present. When the patient starts to speak, he becomes partly dazed by his emotion and does not know exactly what he wants to say. This condition may be present even when he does not stutter; in trying to answer a question, for example, he cannot make up his mind just what he wishes to say. Closely connected with this is a habit of hesitating in thought

that sometimes arises. The mental flurry perhaps explains why some stutterers have most trouble whenever they are jocular. In some cases they stutter only when jocular.

With very rare exceptions the stutterer does not stutter when he knows no one can hear what he says. Almost as rare are the cases where he stutters in singing or in whispering.

The embarrassment and sad experiences of the stutterer often lead to an abnormal mental condition. The patient is nervous, shy, easily embarrassed, retiring, odd in his ways, sad, etc. In some cases the change does not go beyond an increased sensitiveness. Many stutterers, especially young women and schoolboys, acquire a permanent facial expression that is typical of the profoundest sadness. The thought of suicide is frequent.

Three forms or stages of stuttering may be distinguished.

The simplest form of stuttering is that of "pure habit." Such a case occurs rather frequently where a younger child unintentionally copies the stuttering of an older one. If the stuttering does not go beyond the stage of pure habit, the younger child

drops his stuttering involuntarily when the older one is removed or cured.

The habit stage is often initiated by shock or exhaustion. The person finds himself making inaccurate movements in speaking, and speaking a word or words indistinctly. On account of the excessive nervous irritability in these conditions, he feels that he cannot permit himself to speak in an improper fashion, so he instinctively tries to correct the inaccurate movements by an extra effort at distinctness. Such an effort produces excessive muscular tension; his consonants, like "p," "b," "f," "d," etc., are too hard and long. This in turn impresses itself on the memory, so that when he again makes the same sounds he naturally makes excessive muscular movements. The excessive tension readily becomes repetition, so that, for example, instead of a long "p" he says "p-p-p," etc. Such was the case with a patient two and a quarter years old who stuttered constantly by reduplicating the consonants, saying, for example, "strawb-b-b-b-berries" and showing monotony of the laryngeal tone and the usual symptoms. After a few days of correction whereby the stuttered words were repeated correctly

with melodious intonation by the father each time after her, she ceased to stutter.

A patient two years old, when seen three weeks after the stuttering began, could be induced to speak only with great difficulty on account of the feeling of shame that was evidently present. When she spoke, it was in an abnormally low tone, with stumbling and repetition of consonants. There was no neuropathic history, but a previous exhausting illness. Being told to sing what she wanted to say, she stopped stuttering and spoke naturally after a few days. In both these cases we may assume that the exhausted nervous system led to inaccurate movements. These produced a feeling of uncertainty and insecurity, which in turn aggravated the inaccuracy and led to excessive cramplike efforts. Every incorrectness of action increased the uncertainty of feeling, and *vice versa*. The parent's correction soon made the child feel that it was doing something reprehensible; this produced not only embarrassment, but also still greater inaccuracy and uncertainty.

The stuttering habit may be initiated by embarrassment. It sometimes occurs that a lisping child becomes so nervous over his defect and over the way

other people treat him that he begins to stutter. The lisping in such cases is usually due to tongue-tie; this is the only case in which stuttering is connected with tongue-tie.

Quite a few cases occur where the stuttering habit is begun at three or four years of age with no history of shock, exhaustion, or imitation. It is possible that the child's awkwardness in using his speech organs leads him into blunders over which he becomes nervous.

The stutterer nearly always goes beyond the habit stage. People laugh at him, mock him, scold him, threaten him with punishments, or whip him. Usually he is obliged to repeat words he stumbles on. He is made to go through reading and speaking exercises. Extra hard words are given him to practice on. Speaking becomes a torture for him. A new element, the "fear of displeasing and of appearing ridiculous," produces the "fright stage." The stuttering is now a distinct psychoneurosis that may have the most far-reaching consequences.

If the question is asked of a patient in the fright stage, "Why do you stutter?" he will answer, "Because I am afraid that I will stutter." Many a one

will say that if he could only forget that he had stuttered, he would never stutter again. When the stutterer wishes to speak, the thought of his previous failures occurs to him and he fears or knows that he will appear ridiculous to those before whom he is speaking. This element disturbs his mental condition. He is seized with a violent emotion that may be described as stage fright before a single person. Embarrassment, shame, fear, etc., express themselves in his face and often disturb his mental actions so that he cannot think clearly. The emotion may make him absolutely speechless, as in the case of many patients who cannot say a word when introduced to strangers. Or it may make him stumble over his words; naturally he stumbles in the way he has learned to stumble, namely, with stuttering cramps.

The disturbance of mental action during the fright stage may produce a kind of intellectual paralysis. One patient was often unable to answer a question, not because he was afraid of stuttering, but because the requirement of answering actually paralyzed his mind so that he could not think of the answer. This habit had become so thoroughly formed in another

patient that any excitement might render him unable to think; on the football field, where the system of signals required him to add numbers, he would, upon hearing the signals "six and four," which had to be added together, have to ask his neighbor how much they amounted to. One stutterer explained the mental paralysis when asked to give his name or any exact information as resulting from the fact that he is overwhelmed by having some one depend on him for information that he alone can give.

A third stage occurs not infrequently. The stutterer is no longer embarrassed by his defect. It is obnoxious to him, and he would like to be rid of it, but the fright has disappeared. This may be termed the "stage of indifference." It is usually found in older patients; they stutter because the habit is firmly fixed and not because they are embarrassed.

In many cases stuttering seems to be associated with a peculiarity of character. This cannot be attributed entirely to the presence of the stuttering. In one case in my experience the child had previously developed a condition of nervousness which had become very extreme on account of lack of training

in self-control. The stuttering habit, engrafted on this, became very violent. In another case the stuttering was associated with slowness of thought;

17863

FIG. 1. — Recording the movements of breathing by the graphic method. Two metal cups with rubber tops are fixed over the chest by a band. Expansion over the chest draws air into the cups. They are connected by a rubber tube to a small recording tambour. This is a metal cup with a rubber top which moves a light recording lever. A line drawn by this lever on a smoked surface moved by clockwork gives a record of the breathing movements. The recording arrangements can be attached to the abdomen also.

sometimes the hesitation in speech seemed to be a cloak for hesitation in thought. Several previous attempts at cure had failed to be permanent on account of lack of moral backbone. In another

case the stuttering had appeared in a small boy who had never been taught any self-control. Very often stutterers are shy and bashful to an extent that can hardly be justified by their painful speech experiences.

The stutterer's speech movements may be accurately recorded and studied by the methods of experimental phonetics.

The movements of the chest during speech may be recorded by the apparatus shown in Fig. 1.

The "pneumograph" shown in the figure consists of two metal cups with tops of soft rubber. A tape runs around the body from one rubber top to the other. As the chest expands, the rubber tops are pulled outward. This draws air inward through the tubes which open into the metal cups. As the chest falls, the air passes out again.

The "recording tambour" is a metal cup with a rubber top. It is connected with the pneumograph by a rubber tube. As the air is drawn into or expelled from the pneumograph, it passes out of, or into, the recording tambour and makes the rubber top bulge inward or outward. A lever is arranged to indicate the movements of the rubber top.

The registration occurs on a "recording drum" consisting of a metal cylinder revolved by clockwork.

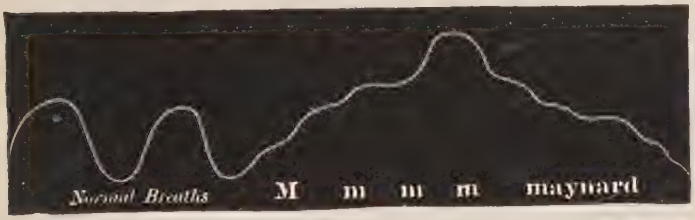


FIG. 2. — Breath record during stuttering.

Around the cylinder a sheet of paper has been

FIG. 3. —Recording the pressure of the lips by the graphic method. A small rubber bulb is placed between the lips and is attached to the recording tambour.

stretched and smoked over a flame. The point of the lever of the recording tambour is adjusted to

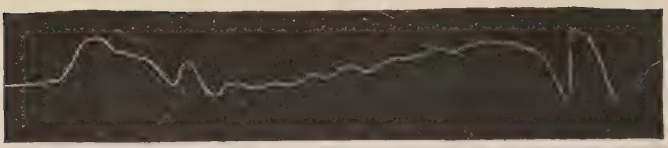


FIG. 4. — Lip record of a stutterer's attempt to say the first letter in the word "Peter."

Instead of a single pressure the stutterer makes repeated contractions.

touch the paper; it draws a white line in the soot. The paper is afterwards removed and the record is fixed in shellac varnish.

FIG. 5. — Recording the movements of the tongue.

A small rubber bulb is placed in front of or on the tongue and is connected to the recording tambour.

To record the breathing movements the pneumograph is hung over the chest or the abdomen by a tape around the neck. The record reproduced in Fig. 2 is from a woman whose abdomen made violent movements outward during certain consonants. The records show the movements for ordinary breathing and the spasms during the attempt to say "m."

The cramps of the lips may be recorded by inserting between them a small rubber bulb (Fig. 3) and con-

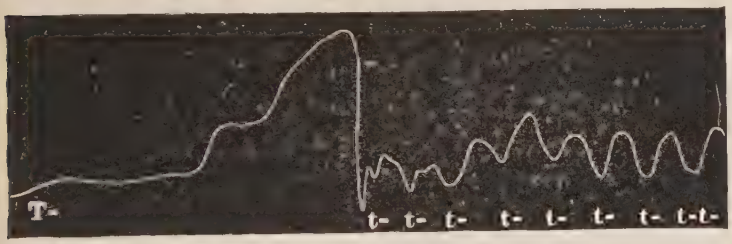


Fig. 6. — Record of a stutterer's cramps of the tongue in attempting to say "Tommy."

necting it to a recording tambour as described above. Pressure of the lips makes the line rise. The record of the movement of the lips in an attempt of a stutterer to say "Peter" is given in Fig. 4. In spite of the long series of convulsive movements the patient could not get beyond the letter "p."

The cramps of the point of the tongue may be recorded by inserting a similar bulb behind the teeth so that the tip of the tongue rests against it (Fig. 5); pressure of the tongue makes the line rise. The result of an effort to say "Tommy" is given in Fig. 6. There is first a violent spasm of the tongue and then a series of smaller ones.

Most interesting records are obtained by a mouth recorder. A funnel of rubber (the top of a large

stomach tube) is held over the mouth ; it is connected to a very small and delicate registering tambour. The entire arrangement is shown in Fig. 7.

A record of the word "papa" in normal speech is shown in Fig. 8. The straight line at the start cor-

FIG. 7.—Recording speech.

The changes in air pressure and the vibrations of the voice pass to a very small recording tambour and are registered on the smoked surface.

responds to the time during which the lips were closed for the "p" — the "occlusion." The sudden rise of the line is the result of the puff of air — the "explosion" — that issued from the mouth as the lips were opened at the end of the "p." The explosion of the

"p" shows two large vibrations. This is due to its suddenness, whereby the recording lever receives something like a sharp blow, and vibrates twice instead of once. The small vibrations that follow are a record of the first vowel, each vibration correspond-

FIG. 8. — Mouth record of "papa" spoken normally.

It begins with a straight line because the lips are closed to produce the letter "p," and no air can issue from the mouth; this portion of "p" is called the "occlusion." The sudden rise of the line shows that a sharp puff of air or "explosion" came from the mouth as the lips were opened; the extra wave in this explosion is due to the vibrations of the lever, resulting from the sharp explosion. The small waves record the vibrations of the voice for the vowel "a." They are suddenly cut short by a descent of the line; this is the result of the closing of the lips for the second "p." The extra wave results from the suddenness of this closure. The occlusion is followed by an explosion. The word ends with the vibrations of the final vowel.

ing to one vibration of the vocal cords. The vibrations end by a sudden fall of the line as the lips are again closed for the second "p." The record of the explosion for this "p" is similar to that for the first one. The word closes with the vibrations of the final vowel.

A record of the word "papa" spoken by a stutterer (Fig. 9) shows a very long occlusion for the first "p," followed by a tremendously long blast of air, corre-

sponding to the explosion of the "p." A slow fall of the line after the first vowel shows that the lips were

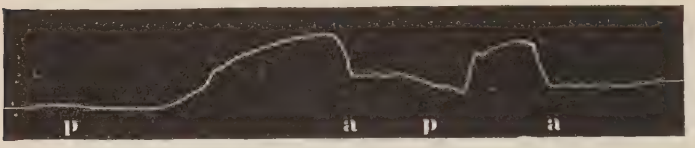


FIG. 9. — Mouth record of "papa" with blowy "p" 's spoke by a stutterer.

The initial "p" has a very long occlusion, followed by a long and strong blast of air. The second "p" is an incomplete occlusion followed by a blast of air. Comparison with Fig. 8 shows clearly how the stutterer's enunciation differed from the normal one.

closed gradually and not suddenly for the second "p." This "p" also has a blowy explosion.

A record of the word "papa" spoken by another stutterer is given in Fig. 10. The record shows that

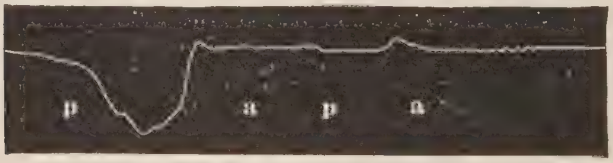


FIG. 10. — Mouth record of "papa" with an inspiratory "p" spoken by a stutterer

The sudden descent of the line shows that the stutterer drew in his breath to make the "p" instead of closing his lips. The vowel vibrations follow as usual.

instead of closing his lips and then opening them for the initial "p," he drew in his breath for a moment and then closed his lips, thus making an inspiration

and an occlusion instead of an occlusion and an explosion.

A record of the word "sleepy" spoken normally is shown in Fig. 11. There is a gradual rise of the line as the air issues from the mouth during "s." This falls rather suddenly as the tongue changes from the

FIG. 11. — Mouth record of "sleepy" spoken normally.
The gradual rise of the line registers the rush of air during the second "s." The small waves record the vibrations of the voice during "l" and "ee." The occlusion and the explosion for "p" and also the vibrations for the final vowel are similar to those in Fig. 8.

"s" position to that for the "l." There is a second rise with faint vibrations for the "l"; these persist as the line continues to fall. The rather long "l" includes the vibrations along the horizontal line. Suddenly the line rises for the vibrations of "ee," as the tongue moves from the "l" position to the more open one for "ee." It is interesting to note that the "l" is so much longer than the "ee." The line suddenly falls as the lips are closed for the "p"; it suddenly rises as they are opened with a kind of explosion. The final vowel is quite long.

In a record (Fig. 12) of the word "sleepy" by a stutterer the sinking of the line shows an initial gasp

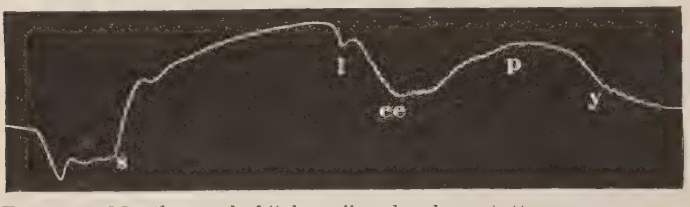


Fig. 12. — Mouth record of "sleepy" spoken by a stutterer.
There is a gasp before the "s." For the "p" there is no complete closing of the lips and no explosion. The small vibrations during the "p" show that the larynx continued to vibrate instead of stopping.

followed by a rush of air for "s." Thereafter come the small vibrations indicating the semivowel "l"

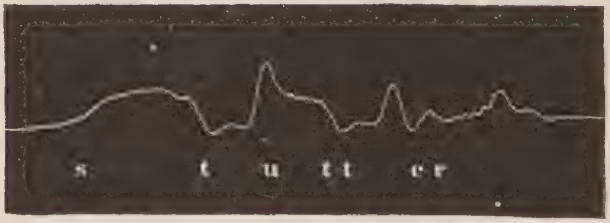


Fig. 13. — Mouth record of "stutter" spoken normally.
There is first a rush of air for the "s," then a sudden fall as the breath is cut off by the tongue in producing the occlusion of the "t." The sharp rise of the line registers the explosion of the "t." The small vibrations belong to the vowel "u." The closure for the second "t" ("tt") and the explosion are similar to those of the first. The final vibrations belong to the vowel "er."

and the vowel "ee." A normal "p" would be formed by cutting off the breath at the lips for a moment. In Fig. 12, however, there is no straight line for the

"p"; that is, the stutterer's lips were not completely closed. Naturally there is no sudden rush of air at the end of the "p." The record of the "p" shows small vibrations, indicating that the larynx continued to vibrate instead of stopping as it should have done.

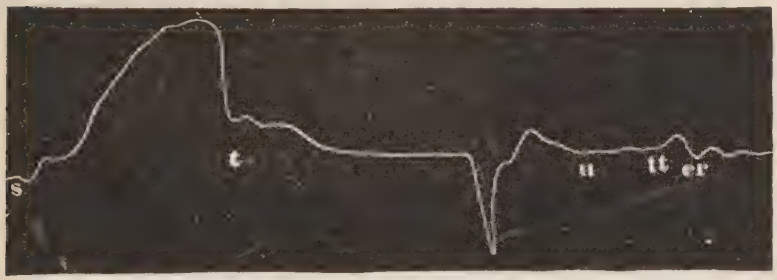


Fig. 14. — Mouth record of "stutter" spoken by a stutterer.
There is an initial gasp followed by a strong "s" and then an immensely prolonged "t." There is then another gasp. The rest of the word is normal.

A normal record of the word "stutter" is given in Fig. 13. It registers the rush of air for the "s" by the upward rising line. The line suddenly falls as the lips are closed for the "t." It rises very suddenly as the lips are opened to let out a puff of air, the explosion of the "t." Then follow the vibrations of the vowel "u." The line falls as the tongue closes the mouth for the second "t"-sound (indicated by "tt"). The word ends with a series of vibrations for the final vowel which is indicated by "er."

A mouth record (Fig. 14) of the word "stutter" by a patient shows an initial gasp followed by a strong "s." Then comes an immensely prolonged "t." At the end of the "t" there is another gasp. The rest of the word shows no marked abnormality.

The beginning of a stutterer's attempt to say "Peter Piper's peppers" is given in Fig. 15. A short

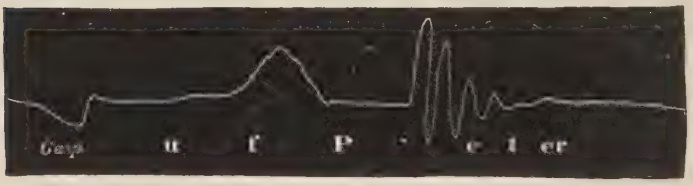


FIG. 15.—Mouth record of "Peter Piper's peppers" spoken by a stutterer.

The stutterer makes a gasp and a vowel sound followed by a blowing sound before he can say the first "p." Such sounds are called "starters." The "p" is long and has a violent explosion. The "t" is so short as to be almost lacking. The "starter" is repeated before each word.

gasp is followed by a long vowel that sounds like "u" in "up." Then comes a blowing noise made by the lips; it is the same as the Greek sound "ph" which is similar to the English "f." All this has to be done before he can say the first "p." The "p" is long; it has such a violent explosion that the large vibrations of the recording lever persist for a considerable time. The very short vowel "e" shows no

peculiarities. The "t" was made so abnormally short as to almost entirely disappear. The last vowel (indicated by "er") was much prolonged. The "uf"-sound was repeated before each word; the entire phrase being spoken about as follows: "uf-Peter uf Piper's uf-peppers."

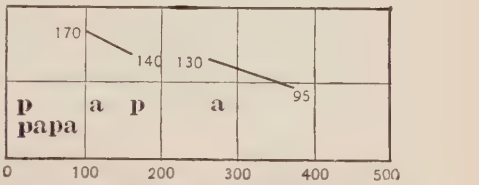


FIG. 16. — Melody plot for "papa" spoken normally (Fig. 8).

Each wave of the vowels is measured. The pitch of the tone corresponding to each wave is then calculated. The results are indicated by a line, — the "melody plot" — which shows how the tone rises and falls. The melody plot shows that the voice started at a tone of 170 vibrations in the first vowel and descended to 140. In the second vowel it started at 130 and descended to 95.

The difference between the use of the laryngeal tone by normal speakers and by a stutterer can be illustrated by comparison of the melody of the voice in the two records shown in Figs. 8 and 9. The length of each vowel vibration is measured under a microscope. The number of vibrations of this length that would occur in one second is calculated. This is the pitch of the laryngeal tone at that instant. The result is marked by a dot on cross-section paper. A line connecting these dots shows the rise and fall of the voice. Such a diagram is termed a "melody

plot." The melody plots for the records in Figs. 8 and 9 are given in Figs. 16 and 17. The monotony of the stutterer's voice is evident.

The view of the nature of stuttering that I have proposed differs essentially from the prevalent theories.

According to Kussmaul the enunciation of each single sound occurs correctly; the trouble is in connecting the consonants with the vowels; this

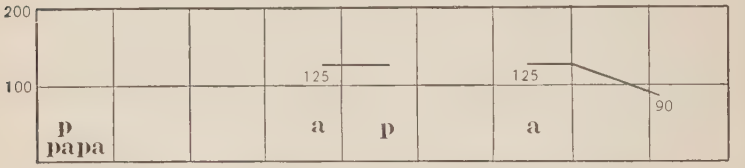


FIG. 17. — Melody plot for "papa" spoken by a stutterer (Fig. 9). The first vowel maintained a tone of 125 vibrations throughout. The second vowel maintained the same tone for a while and then fell to 90.

occurs because the respiratory, laryngeal, and enunciatory muscles do not act harmoniously. This is contrary to fact. In the case of a stutterer, every sound without exception is made more or less incorrectly. Even when he is speaking with apparent smoothness, the over-tension of the muscles (p. 12) is present, and the strained, monotonous laryngeal tone is heard. The cramps affect the sounds themselves regardless of how they are followed. A stut-

terer does not stick on "t" because a vowel follows it, but because he feels he cannot say that particular word; for example, he may stick on "stove" but not on "sto" or "stone."

The statement that stuttering consists purely of a wrong form of breathing simply neglects all the other defects in the stutterer's speech. The theory that it consists essentially in an incoördination of breathing and speech movements quite misrepresents the condition; such incoördination appears typically in the speech of a person intoxicated with alcohol, whose speech is different in every detail from that in stuttering.

The theory that stuttering consists in an exaggeration of the consonants in speech merely takes account of the results. Since the stutterer usually has his cramps on initial consonants, these sounds occupy a great deal more time than the following vowels, and also than the following consonants. There are, moreover, cases where the patient stutters on initial vowels, as in "a-a-a-apple." Since in German the initial vowel really begins with a consonant (the glottal catch corresponding to the *spiritus lenis* in Greek), this might be considered as consonant stutter-

ing. But in English the initial vowels begin clearly. Moreover, the cramped laryngeal tone is present in every vowel in every case of stuttering. The lengthening and exaggeration of consonants or vowels are the results of the cramps, and these cramps are the results of other conditions.

Every one of the above theories neglects just the one vital characteristic of the disease, namely, that the defect is due to the fact that the stutterer thinks some other person is listening to him. As long as he is alone, he can speak perfectly. When a stutterer, who has become so accustomed to me that he speaks perfectly in my presence, is placed at the telephone, he will continue to speak perfectly as long as he sees my finger on the switch that cuts it off; the moment it is removed he knows that "central" will hear him and he begins to stutter.

It has been asserted that stuttering consists essentially of the fear of speaking. This is true as an explanation of why the person stutters as badly as he does when once the disease is developed. The fear of speaking is perhaps the most prominent symptom in stuttering just as in stage fright, but an underlying cause for this fear must be sought for.

The assertion has been made that stuttering is related to tics, to compulsive acts, to the phobias, and to writer's cramp. These conditions are not only utterly different from stuttering, but also from each other.

The essential of a tic is a persistently repeated impulse to a special movement that can be suppressed voluntarily for a short time. The tic movement always involves more than one muscle; it is the remainder of a movement that was once purposive, such as sniffing, twisting the head, blinking the eye, etc. The tic, unlike stuttering, does not involve any inaccuracy, uncertainty, or primary embarrassment or fear.

A compulsive act, like that of touching all the posts as one goes along, or that of never stepping on the cracks in the sidewalk, etc., arises from an almost irresistible impulse to do a certain complicated act. Like the tic, the impulse can be repressed for a while; but the impulse is to a definite complicated act, not to a single movement, as in a tic. Unlike stuttering, the compulsive acts are not produced by any fear, and do not show any inaccuracy or uncertainty.

The phobias are characterized by irresistible fears of objects, acts, or places, as the fear of filth, the fear of committing an act of desecration, the fear of crossing open places, etc. The patient with a phobia knows that his fear is absurd. The stutterer's fear is not only reasonable but also thoroughly justified.

Writer's cramp is a fatigue of the nerve centers due to overexertion in writing. It is a dull pain or an actual cramp, quite unconnected with any mental disturbance. The cramp is spastic and not clonic. There is no mental compulsion, as in tics, compulsive ideas, and phobias. There is no embarrassment or fear, as in stuttering. Penmanship stuttering has been observed in one case.[1] The embarrassment and fear were like those of the stutterer; the cramplike repeated movements were not like those of writer's cramp, but were the same as those of oral stuttering.

According to my view, stuttering is a disease marked by the following cardinal symptoms: 1, psychic over-tension and spasms of the muscles of speech, 2, anxiety (embarrassment or fear), 3, fixation of these conditions by habit, and 4, the existence of these symptoms only in the presence of other persons.

[1] Scripture, "Penmanship Stuttering," *Jour. Am. Med. Assoc.*, May 8, 1909, Vol. LII, p. 1480.

The enumeration of the symptoms does not suffice to indicate the nature of stuttering. The fact that one child becomes a stutterer through imitation or fright or an exhaustive disease, while another does not, indicates some deeper difference in the mental or nervous constitution.

Analysis of the stutterer's condition of mind always shows a serious disturbance in his attitude toward other people. Most patients are shy and timid; the boldness or indifference in other cases is only a kind of bravado to cover up timidity. Much of this timidity is undoubtedly due to the effects of the stuttering, but its intensity is often out of all proportion to the occasion. It may well be that timidity is the basis on which stuttering arises. If this is true, stuttering would then be a condition in which timidity shows itself by a peculiarity in speech.

Social timidity shows itself in mental symptoms that are approximately the same in stutterers and non-stutterers; there are the same strained feelings toward other people, the same bashfulness, etc. The bodily symptoms are also similar; the muscles of the body are more tense than they should be;

there is often also the flushing of the face, etc. There are even resemblances in speech. The timid person, who is a non-stutterer, speaks with a tense voice, he often stumbles over his words and sometimes can hardly get them out; he often sticks or reduplicates like a stutterer. If this "stuttery," timid speech can be supposed to be developed and firmly fixed in a set of habits, the result would be true stuttering.

The fact that stuttering arises only in some cases of timidity and not in others indicates that there is some other element in the disease. The following observations may perhaps suggest what it is. In several cases there has been a determined effort to get rid of the trouble and perfect good faith on the part of the patient, yet I have had the feeling that at the bottom of his soul the patient really did not wish to be cured. This reminds one of some forms of hysteria, psychasthenia, and neurasthenia, where the disease is really produced by the patient in order to obtain some end, although he is absolutely unconscious of this self-production. It may be suggested that stuttering is a defect which tends to exclude the person from the society of his fellows.

and that persons who already have this unconscious tendency instinctively seize upon such a means of encouraging it.

The same mental condition as that underlying stuttering is found in many cases of neurasthenia and psychasthenia where quite other symptoms (headache, tremor, anxiety, etc.) appear instead of the speech trouble. It is often a cause of wonder why some neurotic patients are not stutterers. If we assume that the impulse to segregation from society will use the most likely and effective means for its purpose, we understand why it naturally seizes upon the speech function. We also understand that it will more readily disturb the speech when the mechanism of normal speech is less firmly fixed, as after exhausting diseases, fright, or injury by imitation. When the normal speech mechanism is strong, the psychasthenic impulse must find some other outlet.

Stuttering is therefore a diseased state of mind which arises from excessive timidity and shows itself in speech peculiarities that tend toward a condition of segregation which will enable the person to avoid occasions where he will suffer on account of timidity.

CHAPTER III

DIAGNOSIS

The mere repetition of a word or of an initial syllable is often termed stuttering. Such repetitions occur to every one at times, especially in embarrassing situations. One stutterer said that every boy in the class stuttered when reciting Latin. Various other conditions, such as hysteria, multiple tics, injuries to the brain, etc., may produce repetitions in speech. Such repetitions do not have the same cause or the same systematic regularity as the repetitions due to stuttering in the habit stage; the muscular movements do not have the cramplike stiffness peculiar to stuttering. The symptoms are not the result of embarrassment and fear, as are those due to stuttering in the fright stage. It is quite important to distinguish between the disease called stuttering — namely, the disease whose characteristics have been described in the preceding chapters — and the repetitions often called stuttering which

are found in various other diseases. These repetitions might be called "pseudo-stuttering."

"Organic lisping" is an inaccurate form of speech produced by abnormal conditions of the speech organs. It may be illustrated by the case of the boy who says "sh" for "s" on account of a very high palate. Tongue-tie may cause the child to use "th" for "s." The lisp disappears when the organic defect is corrected. There is no resemblance between the sounds of organic lisping and those of stuttering; in the former the sounds are incorrect because they are incorrectly made, in the latter because they are made with too much force. Tongue-tie never produces stuttering directly. I have had a small boy with tongue-tie who both lisped and stuttered. Upon cutting the tongue band he ceased to lisp immediately, and stopped the stuttering after three days. The tongue-tie caused the lisp, and the embarrassment over the lisp caused the stuttering. A full account of organic lisping is given in Part II.

"Negligent lisping" is a term that may be applied to those errors of speech that are due to defective perception and execution of sounds. Thus "w" is used for "r" because the child does not clearly per-

ceive the difference and because he does not take the trouble to produce the more difficult muscular adjustments required for the "r." Most frequently the tongue is pressed a trifle too hard against the palate so that it closes up the small passages required for "s" and "th," thereby turning both of these sounds into "t" and producing "tun," "toap," etc., for "sun," "soap," etc., or "tick" for "thick." Often "t" is used for "k," as "tandy" for "candy." The defective sounds remain constant, whereas they change in stuttering. The lisper's "s" is always defective, whereas the stutterer may have trouble on initial "s" but not on final "s." Negligent lisping occurs in normal or phlegmatic or mentally dull children, whereas the stutterer is always nervous; some lispers, however, become much embarrassed by their defects, and some even become stutterers on account of embarrassment. Negligent lisping is treated in detail in Part II.

"Stammering" is a term sometimes applied to the speech defects indicated by the German word "Stammeln"; these are the same as those just described under the term "negligent lisping." Often the term "stammering" is applied in a confused

way to a case of stuttering where the patient sticks in his speech rather than reduplicates his consonants. Most often the term is used as identical with "stuttering." It is better to eliminate the word "stammer" in order to avoid confusion.

"Neurotic lisping" is a disease described here for the first time. The person may speak with general indistinctness, appearing to mumble the words, or the incorrectness may be confined to special sounds. One girl of thirteen lisped over all the consonants. She was an excessively nervous child, and she spoke with incredible rapidity. As she was gradually quieted down, the lisping decreased. It became evident that the excessive nervous tension, combined with self-consciousness, produced a tense condition of the vocal organs allied to that of stuttering. She could not produce the smooth and delicately adjusted movements of normal speech because her muscles were overtense. Another girl of twelve was afflicted with partial deafness, which had made it hard for her to learn to speak. Being a sensitive child, the correction of the parents and the embarrassment and fear before them had caused nervousness. She spoke improperly because she over-innervated

the speech muscles. Neurotic lisping occasionally occurs in stutterers. The lisping may sometimes appear in only a few sounds, the others being distinct. One case of this kind lisped only on "s"; the cause was a fright that had left the person excessively nervous. The overtension of the speech muscles, the nervous condition of mind, and the similarity of causation in some cases point to a close relation of nervous lisping to stuttering; they might perhaps justify the term "spastic stuttering." Neurotic lisping may be distinguished from stuttering proper by the fact that the overtension of the muscles is a constant one; the mental excitement seems also to be a steady condition, not varying as in stuttering. Further details are given in Part II.

Bad cases of "cluttering" (hasty mumbled speech) are often confused with stuttering. Although the clutterer speaks with excessive rapidity and slurs over the details of his words, and although he breathes improperly and sometimes sticks in the middle of a sentence, yet the defects are the result of overexcitement and eagerness rather than of anxiety and fear, as in the case of the stutterer. The clutterer speaks better the more he is concerned about his

speech, the stutterer the less he worries about it (see Part II).

"Tic speech" or "choreatic stuttering," or the speech of the "post-choreatic neurosis" (if the terms may be permitted) is characterized by a system of spasmodic movements of constant character that break up the speech in a way somewhat like ordinary stuttering. The trouble originates in an attack of acute chorea. After this has passed, the patient may retain various spasmodic movements which are no longer due to the cause of the original disease, but are really "tics" derived from the choreatic movements. Such cases are frequently diagnosed as "chorea," whereas they are really "multiple tics." The patient with this form of speech usually has various other spasmodic movements of the head, arms, etc. The speech itself does not show the regularity of stuttering. The stutterer will stick constantly for a while on certain consonants; his trouble is nearly always in getting started. The tic-speaker usually begins smoothly and catches and jerks at any moment; there is no regularity or system in the sounds he stumbles over. The mental attitude of the stutterer is characterized by anxiety and fear; the

tic-speaker does not hesitate to speak at any time, and is usually unabashed by his defect.

The speech defects of "hysteria" have often been confused with stuttering. In one case the patient upon being asked a question would hesitate a moment, turn her eyes to one side, and make a movement of the head as if she had just waked up to the question, and then answer with a slight difficulty at the start. The symptom was absolutely constant. Corneal and pharyngeal reflexes were lacking; she was readily hypnotized; all of these pointed to hysteria. Another patient could not say words beginning with "w" because a word beginning with that letter had once shocked his feelings. Sometimes the patient stumbles over all words relating to certain topics. Such patients do not show the cramplike action of the stutterer, and do not have trouble all through their speech; the laryngeal tone is not monotonous; the mental attitude is quite different. They are cases of hysteria, or of "hysterical pseudo-stuttering," and not of true stuttering.

The diagnosis of "hysterical mutism" has been made in cases where the stutterer's fright made him speechless in the doctor's presence. Older persons

that complain simply of inability to speak when meeting strangers will be found, on close observation, to stutter more or less perceptibly.

"Hysterical aphonia" results in a whispered or faint tone of the voice that is present continuously in a sentence; there are no cramps in the mouth or face. The stutterer never has the whispered or the faint voice; he nearly always has some cramps in the mouth or face. He may become speechless for a short time, but this does not occur with the hysterical patient.

In the "spastic speech" of cases of infantile cerebral palsy, the characteristic is over-innervation of all the muscles used to express the idea. In speaking a word the patient contracts not only the muscles of breathing, of the larynx, and of the organs of enunciation, as many a stutterer would, but also makes strong contractions of all the facial muscles. The overcontractions are those that would be needed to overcome heaviness of movement, and are often not well coördinated, whereas the stutterer's overcontractions are those that express embarrassment and are perfectly coördinated for the purpose. In spastic speech there is none of the stutterer's fear.

The over-exertion is continued throughout the sentence. The syllables are equal in length, and are laboriously enunciated.

A record of the word "papa" made by a patient with "cerebral birth palsy" is shown in Fig. 18.

FIG. 18. — Mouth record of "papa" in a case of spastic speech. The occlusion (straight line) for the "p" is followed by a blowy explosion (upward curve). The vowel vibrations are blown upward. All the sounds are longer than those of the normal record (Fig. 8).

The explosion for each of the "p"s is of the blowing kind, more like those of the stutterer's record (Fig. 9) than those of the normal record (Fig. 8). The vowels are also blown, as shown by the position of the line with the fine vibrations. All the sounds are lengthened, particularly the last vowel.

In "motor aphasia" the patient cannot find the words or sounds to express what he wants to say. There is usually a history of trauma or apoplexy. Stuttering nearly always begins in childhood; aphasia is usually connected with old age or injury. The excessive nervousness of the aphasic person sometimes resembles that of the stutterer; it has partly

the same origin in anxiety to get out the words and in fear of being ridiculous. There is no excessive muscular tension or cramp of the speech muscles. The laryngeal tone is normal, and not monotonous. Words or parts of words or letters

FIG. 19. — Mouth record of "papa" in a case of motor aphasia. The syllable "pa" is spoken gently. A long pause follows. The word is then spoken correctly.

may be repeated (pseudo-stuttering), but the cramps of the stutterer do not occur.

One aphasic repeated a word or a phrase over and over before he could go on; for example, "Doctor — doctor — doctor Brown told me to come here. I bring — I bring — I bring what you told me — I bring — bring — bring, yes, bring, bring, I bring, etc;" or "I say to my — to my — to my — I say that to my niece, I have my girl, I have my girl, etc." This is pseudo-stuttering. A stutterer does not repeat a word, but only sounds or syllables; he would have said "D-d-doctor," "I b-b-bring," etc.

A record of "papa" by this patient is reproduced in Fig. 19. The first syllable is spoken normally;

there are no cramps. Then follows a pause, after which the word is spoken correctly. This should be compared with a record of the same word by a stutterer in Fig. 9. Sometimes the patient will repeat the first syllable a dozen times with pauses between. He says that he is for a while unable to recollect what the second syllable is.

This aphasic syllable or word repetition is utterly different in its cause and its symptoms from true stuttering. Kussmaul calls it "aphatic stuttering." It is simply one of the phenomena of aphasia.

In its early stages "multiple sclerosis" sometimes produces a kind of pseudo-stuttering; the later stages are characterized by a scanning speech in which each syllable is brought out with a distinct effort. The characteristic anxiety of the stutterer is absent.

In "hereditary ataxia" (Friedreich's) the speech is slowed, clumsy, and often scanning. There may be hesitation, but there is no true stuttering and no stutterer's fear.

In "progressive bulbar paralysis" the injury to the nuclei in the pons and bulb produces weak action of the muscles of lips, tongue, pharynx, and

larynx. The sounds of speech become mumbled and indistinct. The blurred pronunciation can hardly be confused with stuttering. The weakness of the laryngeal muscles produces hoarseness, dullness, monotony, lowering of pitch, and finally loss of voice. There is no fear of speaking as in stuttering.

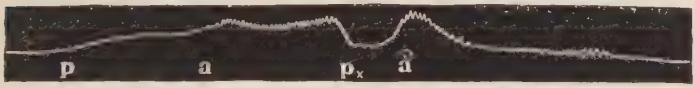


FIG. 20. — Mouth record of "papa" in a case of bulbar paralysis.
For "p" the line rises steadily; this shows that the lips were not closed completely. The strong vibrations for the vowels correspond to the bellowy character of the voice. For the second "p" the lips were closed, but the larynx continued to vibrate. The limits between the sounds are much blurred.

A record of "papa" spoken in a case of progressive bulbar paralysis is reproduced in Fig. 20. Instead of an occlusion and an explosion for the initial "p" there is a steady rise of the line, showing that the lips were not closed completely at any moment. For the second "p" there is also only a slight narrowing of the lips instead of a closure; the larynx does not stop vibrating for a moment as it should.

In "pseudo-bulbar paralysis" the speech is imperfectly enunciated; it may be nasalized; it may become an unintelligible mumble; it may even closely resemble stuttering (pseudo-stuttering). The

weakness of the muscles shows itself not only in speech, but also in every movement; *e.g.* panting, whistling, singing, sticking out the tongue, etc. Similar disturbances occur in swallowing and coughing. The eye muscles and the extremities are usually affected. It is characteristic that, although the voluntary control of these muscles is injured, yet they act perfectly in response to emotional, automatic, and reflex stimuli; for example, although the patient cannot move his lips or the facial muscles when talking, yet he laughs and cries and expresses his emotions in an exaggerated manner. In his speech the muscular action is too weak, in contrast to the too strong action in stuttering. There is no anxiety, as in stuttering.

In the speech of "general paralysis" the sounds are often slurred over, there are no cramps in enunciation, and single sounds are not repeated. Mistakes occur readily in the combination of the parts of a word. For example, the paralytic patient will say "artrallery" or "rartrillery," but it will be said without cramps. A stutterer would say "a-a-a-artillery" or "art-t-tillery." The paralytic can often speak the word correctly by trying very hard; the stutterer

speaks better as he speaks gently. The paretic "syllable repetition" is quite different from true stuttering; the paralytic will say "hippo-po-po-pot-musmus," the stutterer would never say anything like this, though he might say "hip-pop-p-potamus."

The diagnosis of "insanity" with commitment to an asylum occurred in the case of a very bad stutterer. When excited, he would go through the most extreme contortions and gesticulations in the effort to get out a word, and would finally run up and down the room in wild exasperation at his inability to speak.

CHAPTER IV

THERAPY

The prospect of a permanent cure of stuttering is good, provided the patient is willing and able to keep up the treatment for a sufficiently long time. The length of the treatment is variable. With very young children the cure often succeeds in one, two, or a few more treatments. Somewhat older children require three or four weeks or even months of daily treatment. Older persons are sometimes cured rapidly, but they are often very difficult to manage. When the patient receives treatment only during visits to the physician two or three times a week, a permanent cure may require six months or a year. When there is weakness of character, a permanent cure can be effected only by remedying the underlying defect at the same time.

The first step in the cure of stuttering is to look after the patient's bodily and mental health. Most stutterers are anemic, all are nervous. Fresh air

and exercise, proper hygiene of meals, sleep, and moral habits, regulation of school or office work, cod-liver oil, iron, arsenic, etc., are indicated. The treatment of the stuttering is often useless unless the patient is treated for his nervousness; the two troubles aggravate each other, and they should be treated simultaneously. Nose and throat should be in good condition; turbinates, polyps, septum, adenoids and tonsils should be treated if necessary.

At the outset it is usually necessary to explain to the parents how the stutterer is to be regarded at home, or to the patient himself how he is to regulate his life. The home attitude during the fright stage should be such that the stutterer should be encouraged to forget himself. His attempts at new ways of speaking should not be commented upon. Mistakes and relapses should not be noticed. The patient should never be blamed. With rare exceptions the attempt of a parent to correct or help the stutterer is an added irritation and a direct hindrance.

The treatment of stuttering is based on the following principles.

The "principle of a new method of speaking" is founded on two facts: first, that the stutterer speaks

in an abnormal voice, which we may call the "stutter voice"; and, second, that he does not stutter

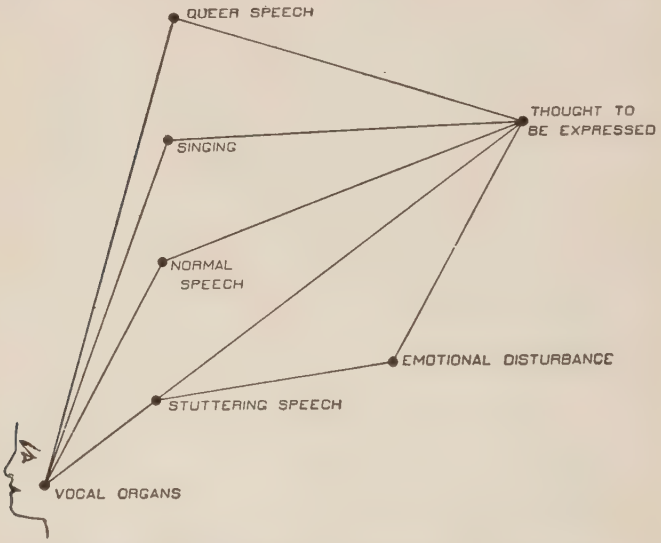


FIG. 21. — Scheme to illustrate the mechanism of stuttering.

When the stutterer attempts to express a thought in his usual voice, he is obliged by the emotions connected with speaking to cramp his vocal muscles. If he expresses his thought by singing, by queer modes of speech, or in any other way unusual for him, he has no difficulty. The normal way of speaking differs so much from the stutterer's voice that it is just as unusual to him as the queerest voice can be. He cannot stutter in a normal voice.

when he expresses his ideas in any other voice, such as the singing voice.

The scheme shown in Fig. 21 expresses these two facts. When the stutterer tries to express a thought in the presence of another person, the action of his speech

is interfered with by the emotional condition (embarrassment or fear) that is aroused at the same time. He therefore speaks in his stutter voice. If he tries to express the thought in any other way than the usual one, the emotional disturbance does not arise. This explains the familiar fact that a stutterer never has any trouble when he sings what he wants to say.

Since the patient does not stutter if he speaks in any unusual way, he can be taught to speak in some kind of an odd voice. The stutterer can at any time speak without stuttering if he will use an abnormally low voice, or an abnormally high one, or if he will drawl the vowels or slur the consonants, or if he will speak in a choppy staccato voice, and so on. These are the methods of the "stammer schools" and "stutter curers." They are objectionable because they leave the patient with a queer voice. He is likely to have it told him that the "cure is worse than the disease." He usually gives up the queer voice after a while and becomes a stutterer again because the queer voice itself produces embarrassment and he naturally feels like discarding it.

The essential point is that the stutterer feels his manner of speech to be different from his stuttering

voice. One patient could never dictate to his stenographer. I found that he could not distinguish one note from another in music. I told him to sing what he wanted to dictate. He did so without the slightest hesitation or difficulty, in what he supposed to be a singing voice; it did not differ, however, from his stuttering voice, except in being slightly easier and more natural. As long as he thought he was singing, he did not stutter, although he did not sing. The cure was a failure because he refused "to make a fool of himself by singing to his stenographer." To have enlightened him concerning the fact that he did not sing would have destroyed the belief that he was singing and would have made him a stutterer again. There was no way out of the dilemma.

There is another way of speaking which is unusual to the stutterer, namely, the way in which the normal person speaks. When he speaks in this way, he does not and cannot stutter. The therapeutic procedure on this principle will therefore be to teach him to speak normally. Each of the abnormalities that appear in his speech has to be determined and corrected. The result is perfectly normal speech.

This is the only method of cure that should be permitted.

The "principle of relaxation" is used to aid in overcoming the emotional condition of the stutterer. It is pointed out to him that he speaks in a hard, strained voice. He is taught to speak softly, melodiously, and pleasantly. It is quite effective to get him to go through various exercises while lying down and trying to doze; a hypnoid or a hypnotic doze aids in relaxation.

The "principle of habit formation" implies that the new way of speaking is to be drilled into the patient till it becomes a habit. The greatest difficulty lies in the fact that speech is so automatic that we practically never think before we speak. The training requires the patient at first to think how he is to speak each time before he actually speaks. The first steps require him to repeat sentences, poems, etc., after the instructor. This is continued till proper habits are formed. The final result must be a purely automatic system of speech habits. If the treatment falls short of complete automatism in the new form of speech, the patient will probably drop the habit and become a stutterer again.

The "principle of spontaneity" is requisite because, when the patient has learned to repeat perfectly, he will still be unable to do so when he speaks of his own accord. A gradually increasing amount of spontaneous speech is introduced into the treatment. A good method is for the instructor to speak declarative sentences and questions alternately; each declarative sentence is repeated by the patient, but each question is answered. He is urged to speak the answers in the same tone and manner as the questions Gradually longer answers and then free conversations are introduced. The patient should finally talk freely and perfectly. Another method is to give the patient something to read. At first the instructor reads with him; soon the instructor drops out for an ever increasing number of words until the patient can read alone.

The "principle of increasing embarrassment" arises from the fact that, even when the patient has learned to speak perfectly in the presence of the physician or the instructor, he is unable to do so under other circumstances. The patient is taught to speak properly before a few other persons or before a class. Still more difficulty is introduced by

making introductions, speaking over the telephone, buying in stores, reciting in school, etc. For the introduction exercise the stutterer practices at first privately and then with gradually increasing numbers of strangers. The other problems are met by exercises to develop confidence.

The "principle of equilibration" responds to the fact that some patients are abnormally lively and expressive while others are retiring and depressed.

The former type is quite the usual one among small boys. They are characterized by excessive volubility; their speech runs in a stream, they reply before you have finished your remark, they continually insert remarks in the conversation of others, they often talk and act in a way that is "fresh" or even impertinent. It often happens that the patient stutters only when he gets into such a flippant mood, or when he thinks of something funny. This is the mood expressed in the jokey style of talk of the mining camp, of the swaggering tough, and to a lesser degree of college boys. The very essential of the cure lies in repressing such patients. It is explained to them not only that their manner is improper and offensive, but also that their stuttering

is due to their lack of self-control. They are required to keep silent when others speak, to silently count four before speaking, to speak in time to a metronome, to speak no unnecessary word, etc.

The other type of stutterer is ashamed to speak, or is dejected and depressed. Such are many of the older boys and the young men and women. They need to be encouraged. It is explained to them that there is a chance for them to escape from their bondage and that life may become bright and happy. Moreover, they are not to take their defect so seriously; others have the same trouble. It is useful to accompany such patients to stores, to their homes, etc.; a helpful word is inserted when needed. It is pointed out to them how much their speech improves from week to week. When a patient has serious trouble on certain occasions, for example, buying in a certain store, it is often stimulating to bet him that he will have the same trouble next time.

The "principle of correct thinking" indicates that the abnormal habits of thought, which a stutterer always acquires to a greater or less degree, are to be corrected by appropriate exercises.

A frequent abnormality is that of getting into a

daze at each effort to think. The patient finds that he cannot decide promptly. It was typical of one patient that upon being asked "Which kind of dog do you like best?" he hesitated, and grunted, and finally said, "I really cannot say which I like best." He was cured by being obliged to give some kind of decision quickly, regardless of whether it was correct or not. The trouble was due to the mental flurry or daze that had become a habit. Another patient, when leaving a house, found himself unable to say "Good-by" because some friends were waiting for him. The trouble arose from a conflict between the motive to hurry after the friends and the motive of not offending the host; this produced a mental daze that left the patient speechless.

The school exercises of another patient were learned in such a hazy fashion that he had a feeling of uncertainty when reciting; this made him stutter violently. The habit of hazy knowledge may extend to every topic in life; the patient must be trained to know perfectly and surely what he does know, and to recognize exactly what he does not know.

The "principle of correct enunciation" responds to the fact that some stutterers enunciate indistinctly

or incorrectly. This may be due to confused and incorrect notions concerning sounds; such a condition is a form of "negligent lisping" (Part II, Chap. I). It is sometimes due to a general excess of muscular effort; this is a form of "neurotic lisping" (Part II, Chap. IV). The exercises for general indistinctness (p. 157) are to be employed.

An important principle is "belief in the success of the treatment." When the belief is strong, the patient makes his readjustments more eagerly and is bolder in using them in speaking to others; the consequent success encourages him and gives him confidence. This in turn leads to still further success. With a patient who is consciously or unconsciously doubtful of the outcome, the treatment becomes laborious. With such patients and with all who have become doubtful through failures or relapses, a careful psychanalysis (see below) may be needed to remove the doubt.

A thorough "correction of character" has to be frequently carried out in order to produce a complete and permanent cure of the stuttering. Whenever possible, the patient should have his entire life studied and regulated by the physician.

Defects of intellect and morality have to be treated by the appropriate methods. The neglect to reform a person's character frequently results in failure of the cure to be permanent.

The "principle of subconscious readjustment" recognizes the fact that only a very small portion of our mental life is conscious. From earliest infancy our characters have been developed by our surroundings and by the experiences we have passed through. Our past has been mainly forgotten, but its results are present in our traits of character. The last one to have any idea of his character is the person himself. The cause of the stutterer's trouble is entirely unknown to him. It is purely mental but it is subconscious, and a cure is often possible only by a careful study of the patient's subconsciousness. This can be done only by the methods known as "psychanalysis". Some of these methods are briefly described below.

The usual conditions under which the cure is to be achieved include, in the first place, individual treatment at the physician's office.

My method is to give the patient a thorough mental and bodily examination. The general anam-

nesis covers the history of the present illness, its presumable cause, heredity (stuttering, nervousness, asthma), past diseases, education, habits (tea, coffee, alcohol, tobacco, drugs, sleep, food, work, sex), appetite, digestion. The general status includes the size, height, weight, general condition (nourishment, anemia, exhaustion), general intellectual appearance, urinary analysis (albumen, sugar, indican), circulation (heart). Special examination of the organs used in speech includes the nose (septum, turbinates), throat (adenoids, tonsils), larynx (catarrhal conditions), chest (diameter expanded, retracted, capacity by spirometer). The special anamnesis can be obtained only gradually as the patient's friendship is gained. It should furnish all sources of nervous strain in his life. He is asked to give a most careful account of his relations to the other members of his family, to his schoolmates or his friends, to chance acquaintances, to the community, and to mankind. On each of these topics he is to compare his attitude to that of other persons. The object is to relieve him of all feeling of strain by making him realize that all human beings are built on the same principles as he is, and that they are not stran-

gers before whom he should have any feeling of fear or distance. Since the patient stutters least before persons who have the most sympathy with him and notice his trouble least, he is brought to feel that the whole world is much more friendly than he supposed.

Without waiting to get a detailed special anamnesis, work may be begun with exercises, and, in some cases, with psychanalysis.

The exercises are prescribed at each sitting as the various faults show themselves. If the patient speaks too fast, one or more slowness exercises are ordered; if too stiffly, melody and flexibility are indicated; if the breathing is incorrect or the tone is husky, the appropriate exercises are noted, etc. An attendant, who has been listening to the physician's criticisms and explanations, then carries out the exercises with the patient.

Psychanalysis is begun by free associations and the analysis of dreams, as described below. This immediately brings physician and patient into the closest personal relations; the latter will discuss matters that he would not mention otherwise; the special anamnesis is obtained rapidly. Moreover,

it brings to his mind many important events of the past and calls his attention to many conditions in the present otherwise overlooked. Finally, it is used for a study of the patient's subconscious condition. The distinction between the conscious and the subconscious elements of his mental life are explained. As he learns to realize the points in which his mind works differently from what it should, he involuntarily proceeds to a gradual correction.

The physician should gain the patient's friendship and devotion. His ability to develop the patient's confidence is one of the chief factors of the cure. The patient should be willing to devote a large amount of time to the exercises with the attendant. Office treatment has the advantage that it does not remove the patient from his business or school and also that it enables a cure to be gradually worked out in the environment in which the patient must live.

The final success or failure of the treatment depends largely on the patient's determination to persist until the cure is complete. Sometimes a patient will spend many months with only gradual improvement; finally the resistances and ancient

habits suddenly break down and the patient is cured rapidly. He should make up his mind that at any cost he will continue treatment until he speaks perfectly. When he does speak perfectly, he should not drop the treatment. He should return at steadily increasing intervals for examination and for any needed revision. When he reaches a six-months interval, he should make a permanent arrangement to return at such an interval; this is not too much to ask, even a dentist makes that demand. It is true that some cases get well in a few treatments, and that most cases do not have relapses; but no one can tell beforehand how any one case will turn out.

Another form of treatment is that at an institution. The patient lives with the physician and attendants in a special house. He suddenly breaks off all connection with his past life and enters upon a novel series of experiences in strange surroundings where people constantly supervise his speech. His entire manner of life — bodily and mental — is subject to regulation. This form is very effective when it can be carried out. The separation from the family is often absolutely necessary for a cure.

Treatment by classwork has a great advantage in the feeling of solidarity it awakens and in the inspiration of being cured together with others. It is used in the office and institutional forms of treatment by holding daily classes for the various exercises. The interest and enthusiasm that can be awakened by the various exercises, by the telephoning, by the ticket selling, by the impromptu vaudeville, by the debates, etc., are most beneficial.

In the speech clinic the treatment must be mainly in small groups or classes. So far as possible, the physician should attend to the patients individually also.

In connection with the public schools a careful examination should be made by a competent physician of every child who does not speak perfectly. Stuttering must be carefully distinguished from the other nervous defects. In all cases of defective enunciation (Part II) there should be tests of intellectual development also. Many of the stutterers and some of the lispers can be treated in special classes conducted by trained experts under direction of the specialist. Whether these classes are held during school hours, after school hours, or in vacation is a

matter that must depend on local conditions. Quite a number of the stutterers and lispers must receive special individual treatment. The other speech defects can be treated only on directions from the specialist.

CHAPTER V

METHODS OF TREATMENT

The object of the treatment is to give the stutterer a normal voice and a normal state of mind. The following methods of treatment are those that will be found most efficacious: —

Training in Melody and Flexibility

The tone of the voice, which rises and falls as we speak, is produced by the vibrations of the vocal cords in the larynx; it may properly be termed the "laryngeal tone."

The stutterer cramps the muscles of the larynx so that he speaks in a monotone. The cure consists in putting melody and flexibility into his laryngeal tone.

By "melody" we mean the rise and fall of pitch for successive syllables. Melody may be indicated by notes on a staff or by the rise and fall of a line. The tones on which the words "How do you do?"

may be sung are indicated by the notes in Fig. 22 or by the line in Fig. 23. In speech each syllable has a rise and fall in pitch, as indicated in Fig. 24.

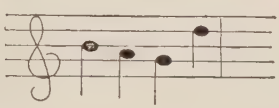



Fig. 22. — Notes indicating how the phrase "How do you do?" is to be sung.

The speech of the stutterer is monotonous and stiff, having neither melody nor flexibility (Fig. 25).

A record of the word "papa" as actually sung is reproduced in Fig. 26; its melody plot is given in

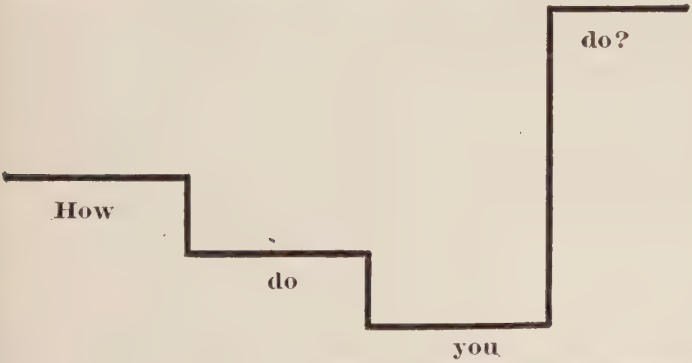


Fig. 23. — Line indicating how the phrase "How do you do?" is to be sung according to the notes in Fig. 22.

Fig. 27. Comparison of Fig. 27 with Figs. 16 and 17 show vividly the differences in melody among the three forms of expression.

The pitch of the laryngeal tone is determined by

the degree of tension of the vocal cords. To vary the pitch constantly, as in Fig. 24, the cords must change their adjustment at every instant; that is, the laryngeal muscles must be freely and delicately

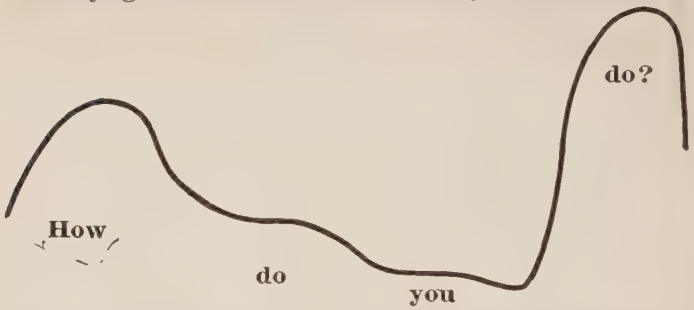


FIG. 24. — Line indicating how the normal voice should rise and fall in speaking the phrase "How do you do?" with a melody similar to that indicated in Fig. 23.

poised and must act readily and accurately. The stutterer, however, cramps them up so that they can

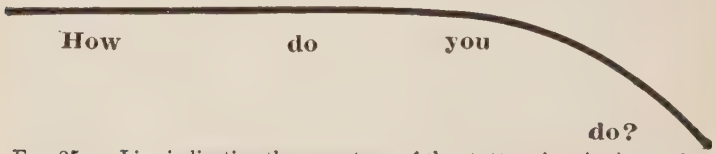


FIG. 25. — Line indicating the monotony of the stutterer's voice in speaking the phrase "How do you do?"

move only with difficulty. He sticks to one tone as much as possible. His action resembles that of a child who cramps a pencil tightly in his hand; he can draw a straight line with a ruler to guide him, but he cannot write or draw gracefully.

The laryngeal cramp may be broken up by the "melody cure." The stutterer is first taught to sing a song or a phrase while accompanied by the

Fig. 26. — Mouth record showing the word "papa" as actually sung. The vibrations of each vowel are of the same length throughout.

piano or another voice. His voice will rise and fall, as indicated in Fig. 23, and he will have no stiffness or cramps. Then he must speak the word on the

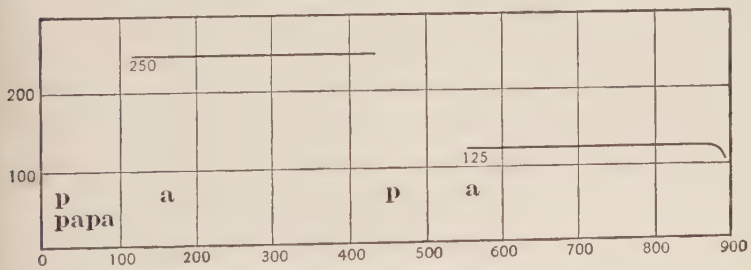


Fig. 27. — Melody plot to Fig. 26.

same notes, first with and then without musical accompaniment. This gives him the idea that he must put melody in place of monotony.

The patient now learns to make his voice "flexible." The instructor pronounces various words in such a way that the laryngeal tone passes over two octaves in the first important vowel; this may be

octaves in the first important vowel; this may be called the "octave twist." Fig. 28 indicates the method in musical notation. In Fig. 29 the general change is shown by a line.

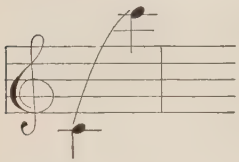


Fig. 28.—Octave twist in musical notation

In going over two octaves in this way the voice passes from the chest register to the head register. For these registers the laryngeal adjustments are quite different. The stutterer always speaks in the chest register. If he leaves this register, he must relax the muscles, that is, he must drop the cramp and start a new adjustment. An analogy may be found in raising a weight by the arms from below the waist to over the head. One set of muscles pulls it up to the shoulder, but an entirely different set

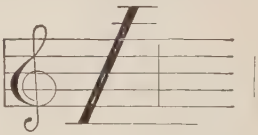


Fig. 29.—Octave twist indicated by a line.

Fig. 30.—Mouth record of "papa" spoken with the octave twist. The waves of the first vowel become shorter and shorter; this indicates that the voice rises steadily.

must be used to get it up any further. The stutterer will try to raise his voice while keeping to the chest register; he will usually stop at the fifth or the

octave instead of going over two octaves. As long as he does this, the exercises do him no good

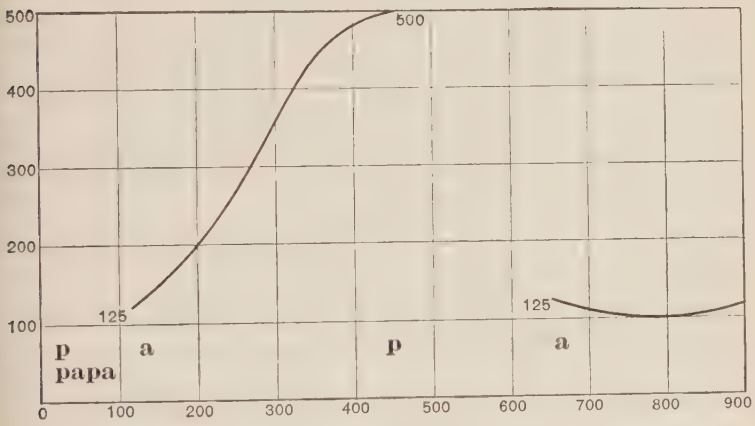


FIG. 31.—Melody plot to Fig. 30.
The voice rises through two octaves in the first vowel.

whatever; he must be persistently trained until the full octave becomes easy.

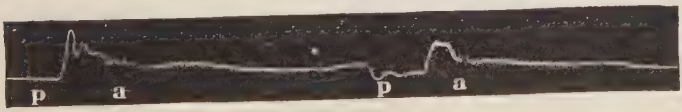


FIG. 32.—Mouth record of "papa" spoken with an unsuccessful attempt at the octave twist.
Although the vowel waves become shorter in the first vowel, they do not become as short as in FIG. 30.

A record of the word "papa" spoken with the octave twist is shown in Fig. 30. The waves of the first vowel become shorter and shorter. The melody

plot (Fig. 31) shows that the voice rose through two octaves.

The common fault of the beginner who sticks to the chest register and fails to rise two octaves is shown in Fig. 32. Although the waves of the first vowel become shorter, it is very evident that they

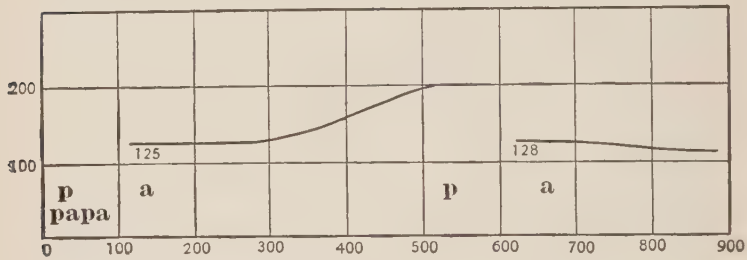


Fig. 33.—Melody plot to Fig. 32.
The voice fails to reach an octave on the first vowel.

did not become short enough. The melody plot is given in Fig. 33.

The melodization of the voice goes on day after day until the stutterer can do it perfectly. Usually all the other kinds of stiffness and cramps disappear together with the laryngeal stiffness, because the stutterer has learned to speak with a new voice, that is, to use a new set of habits free from the stuttering impulse. The object of the melodization and the octave twist is relaxation of the muscles

of speech. When this has been accomplished perfectly and permanently, the person may speak in any way he pleases.

Correcting the Vocal Quality

The stutterer's voice usually sounds hoarse and breathy. This is due to improper action of the laryngeal muscles whereby the vocal lips are not brought closely together. Perfect closure is shown in Fig. 34; one condition for the breathy tone is shown in Fig. 35.

FIG. 34.—Perfect closure of the glottis.

The vocal cords close tightly together in producing a clear tone.

This "stutterer's hoarseness" can be readily corrected by exercises in which the patient sings and speaks "ah" with the glottal catch (*coup de glotte*) at beginning and end of the sound. The breath is held back by closing the glottis; the vowel begins suddenly with strong vibrations; it is ended by snapping the glottis shut again. Figs. 36 and 37 give records of a normal English vowel and a vowel marked off by glottal catches; they were

FIG. 35.—Glottis during a breathy tone.

The cords do not come together completely and the tone sounds husky or breathy.

made by the apparatus shown in Fig. 7. Such a vowel begins like an initial vowel in German. It is usually not difficult to teach this to the patient. In a similar way the patient learns also to speak

Fig. 36. — Vowel curve with normal beginning and ending. The voice starts to vibrate gently and ends in the same way.

vowels. Other exercises include staccato singing and staccato speaking of words and sentences.

It is a rather common fault of the stutterer to let the laryngeal tone (tone of the voice) cease before he ends the last word, whereby the end of the word is

Fig. 37. — Vowel curve with glottal catch at beginning and ending. The vocal cords close tightly together and then open with a sudden snap as the vowel begins. The vowel is ended in the same way.

spoken in a hoarse whisper. This is corrected by having him snap his glottis shut as he ends the word.

Almost invariably stuttering children and women use a voice that is abnormally low. A child of ten will sometimes speak on a pitch that belongs to an adult. For correction a child practices singing

songs of appropriate pitch; then he sings sentences to melodies he has learned; then he half sings, half speaks them on the correct tones, and finally he simply speaks them likewise.

The stutterer's voice is usually very poor in quality; it sounds thick, as though the throat were stuffed with cotton; there is none of the sharp resonance that characterizes a good singing or speaking voice. The method of correction is much the same as for a student of vocal music. The patient is trained in singing scales, arpeggios, and songs in sharply resonant tones. The resonant tone is then carried over into speech.

The bad quality of the stutterer's voice is due to improper action of the various muscles involved in speaking. Some of these muscles are not sufficiently tense, while others are violently contracted. There seem to be constant relations according to the law that a lack of contraction of one set is accompanied by excessive contraction of a certain other set; thus, the usual failure to raise the velum (soft palate) sufficiently is always accompanied by strong contractions of the jaw muscles, a condition which is not only unnecessary, but also distinctly pernicious.

Another common defect is underaction of the palatopharyngei (rear arch of palate) with overaction of the palatoglossi (front arch). Very frequently there is overaction of the mylohyoid and geniohyoid whereby the larynx is pulled forward away from the backbone. Correction of such defective action of the muscles used in speech requires special exercises (Part III).

Correcting the Breathing

Stutterers generally have cramps of the breathing muscles, or they breathe in hurried gasps, or they blow out almost all their breath before speaking, etc. Usually it is sufficient to train the stutterer to take a breath before each sentence and not to let any of it out before he speaks. Exercises in reciting the alphabet several times in one breath, trying to say as much as possible of a poem likewise, etc., are useful. Passive and active exercises may include the usual special calisthenic movements; *e.g.* chest lifting with expansion, upward arm stretching with resistance, standing-breathing with arms front upwards and side downwards, broad standing neck front sidewise bending, same with trunk twisting, etc. These and gymnastic exercises (chest weights, running, and the like) aid

in giving command of the breathing organs and produce a feeling of confidence in them. The abnormality in breathing usually disappears when the stutterer speaks with the octave twist (p. 78).

Developing Slowness

Almost without exception stutterers talk too rapidly. They do not realize this fact, and they often refuse to believe that they talk as fast as another person who imitates them. They have two different measures of rapidity, one for themselves, the other for other persons. The correction of the fault is most difficult; it can be accomplished only by frequently repeated exercises and continual reminders. Many stutterers are cured in a relatively short time of everything but excessive rapidity; owing to its persistence they repeatedly relapse. Others seem able to speak slowly only with the utmost difficulty; in such cases a cure of the stuttering is often impossible as long as the excessive rapidity is not overcome.

Exercises in slowness are given by having the patient read and repeat poems and sentences in time to a metronome beating 54 times a minute. Conversation is carried on likewise. Later the conversation is carried on just as slowly, but without the metronome.

Speaking with the metronome usually makes the voice hard, unless special attention is given to softness. Some kind of pendulum, such as a weight on a string, may be used instead of the metronome.

Quite useful is persistent drill in speaking with lengthened vowels, for example, "The su-u-u-u-un is se-e-e-etting." The voice must be kept soft and melodious.

A stutterer often thinks he gains slowness by putting pauses between words, whereas each single word is spoken as quickly as before. This produces jerky speech.

Training in Proper Thinking

A common trouble is the inability to say a certain word that the patient wants to use. He may be unable to read the names of a list because he may stick at any one. Or he is constantly looking ahead in his conversation for words he may not be able to say, and he spends much of his mental energy in substituting other words for them.

Exercises are instituted wherein the patient gives the names of objects pointed to. This he does first by singing them and then by speaking them melodiously.

The most common defect is the inability to go directly to the point to be brought out in speech. A series of graded exercises is to be used. A word is called out, to which the person is to respond with the first thing he thinks of. For example, when the instructor says "rose," he may answer "flower." This "simple association of ideas" is to be made as quickly as possible. Measuring the "association time" with a stop watch in fifths of a second is an effective stimulus. In a somewhat more difficult exercise the patient is required to make such associations in a series, starting from a given word and making as many as possible in ten seconds. For example, on hearing the word "shoe" the patient may associate "lace-black-mourning-death-skeleton-medicine-doctor -cravat-etc." Somewhat greater difficulty is involved when all the associations must be connected with the given word. Considerable more difficulty is introduced by requiring each association to refer to the preceding one in the relation of (*a*) part to whole or (*b*) whole to part. For example, to "room" the association might be "floor" (*b*), "board" (*b*), "house" (*a*), "city" (*a*), "street" (*b*), "sidewalk" (*b*), "stones" (*b*), "hills" (*a*), etc.

The indefinite or dazed condition of mind of the stutterer applies specially to his notions of words. It is frequently accompanied by inability to spell correctly; in such a case exercises in spelling are to be used.

Some stutterers develop the habit of frequently breaking off a sentence and repeating it with a changed construction. In such cases this may not be due to the desire to avoid certain words, but to a hesitating habit of mind. The patient should be required to stick to his original sentences. Exercises in conversation carried on entirely in short declarative sentences can be readily devised.

Correcting Enunciation

The excessive muscular tension of the stutterer is to be combated by training him to keep his muscles relaxed. To correct individual sounds he repeats words with that sound, first with the sound omitted and then with the sound much weakened. If the stutterer is troubled by initial "b," he reads or repeats words beginning with "b" but omitting that letter, for example, "-utter" instead of "butter"; then he pronounces the same word with a very faint

"b," thus, "butter." This can be done for all sounds with which he has trouble. Words may be found in a dictionary or in the lists in Part III.

The stutterer often places his tongue or lips incorrectly while stuttering. He may learn the correct positions for any sounds that trouble him and may

FIG. 38. — Mouth record of the stutterer's correction of the inspiratory "p" in Fig. 10.
A correct occlusion is followed by a fairly successful attempt at an explosion.

try to get these positions. On the principle of a new method of speaking (p. 57) this is often effective.

For many stutterers it is of great benefit to study the positions of the vocal organs for the vowel sounds, as shown in the Plates at the end of this volume. The stutterer's incorrect enunciation, however, usually does not arise from the placing of the organs, but from abnormal use of them.

The incorrectness in use can be accurately and strikingly shown by the graphic method. The record of a stutterer's inspiratory "p" is given in Fig. 10. After the nature of the defect had been explained to

him, he tried to correct his mistake; with the eighth attempt he was able to change the inspiratory "p" into an explosive one, as shown in Fig. 38. The result was not a very good "p," but the essential fault had been overcome.

Developing Confidence

The most serious disturbance in the stutterer's emotional condition is lack of confidence in his ability to speak when he wants to. The following procedure is serviceable when confidence in the voice is utterly gone; it can be abbreviated as may be necessary.

A tone is produced on a piano, organ, or some other musical instrument. The instructor sings "ah" at the same time. The patient then sings it with the instructor while the piano sounds. This is repeated until the patient declares confidently that he is sure he can at any time sing a tone with the instructor and the piano. Then the patient is to sing the tone without the instructor. If he hesitates, the instructor sings also. This is repeated until he declares that he can at any time sing a tone with the piano. Thereafter two, three, and more tones are used in the same way; a declaration of confidence

is made at each step. Often it is convenient to begin at once with the arpeggio *c-e-g-c'* instead of single tones. The preceding steps are generally unnecessary, as it is usually possible to begin at once either with singing or with repeating sentences.

Children are usually ready to sing without hesitation or diffidence, and it is often best to begin the treatment with simple songs, because the child knows that it never stutters when it sings. If the child is at all diffident, the instructor sings a line of it first alone; then the instructor and the patient sing it together; then, if necessary, both start together, but the instructor drops out while the patient keeps on; finally the patient sings the line alone. In this way he learns to sing various songs with the fullest confidence. Other words are now substituted for those of the first line of the song. Sentences like "This is a very fine day," "My name is Jack Robinson," etc., are sung to the notes of the piano. Then the instructor sings a question and the patient sings the answer; for example, "What is your name?" "My name is Jack Robinson." The patient becomes fully convinced that he can sing anything he wants to say.

Having gained so much confidence the patient is now to learn that he can always speak properly in a singsong tone. With most older patients the preceding practice in singing may be omitted and the singsong may be started at once. The best form of singsong is a frequently repeated "octave twist" (p. 57). The patient reads or repeats with the instructor a sentence or a poem whereby the voice is made to go over the octave several times; for example, in the lines "A wee little boy has opened a store" the octave twist would be used in "wee," "boy," "o" of "opened," and "store." Then he repeats such material after the instructor, and finally says it alone. He practices till he is quite confident that he can do this perfectly.

The instructor reads a series of sentences and questions (as in a traveler's manual) in a like way. Whenever a statement occurs, the patient repeats it. When a question occurs, he answers it spontaneously, striving to keep the flexible intonation. The most careful watch is kept on the octave twist. Some patients persist in raising the voice only a fifth (*c* to *g*) instead of an octave (*c* to *c'*) when repeating a sentence. In answering questions all patients at

once drop back to the stiff stutterer's tone, and fail at first to get the octave twist. The patient's answer should be used as a sentence for repetition whenever it does not have the proper intonation. By gradually developing the melodious speaking during answers to questions, the patient ultimately finds that he can always speak independently with the octave twist. It is pointed out to him that it is impossible to stutter and to use the octave twist at the same time; the instructor tells him, and he will agree, that he need never stutter again if he can only remember to use the octave twist always. Of course, it is impossible for any one to always think of this before he speaks; therefore this way of speaking must be persistently drilled till it becomes automatic. It is also true that, even though he forms the habit while at work in the office, he will at once drop it as soon as he becomes worried by the presence of another person; further development is thus necessary, as follows: —

When the patient has gained confidence in this work with the instructor, another person is brought in to listen to him. This should be done in such a way as not to embarrass him. If the patient is a child,

he should first be praised for his progress, and then asked if he would not like to let his mother or sister see how well he is doing; the other person should be instructed beforehand to praise the patient's success. With older people it is well to begin with the presence of the doctor's assistant or with some one whom he feels not to be a critic. It may be necessary to go over the whole routine again in order to develop confidence before a third person. When this is accomplished, still more people are brought in. It is often very inspiring for the patient to go through these exercises in company with other stutterers. Strangers are gradually added to the group.

If the patient stutters when reading, a similar method is pursued. He first reads in unison with the instructor. The latter stops for a few words at a time, leaving the patient to read independently. Gradually the stops are longer, until the patient can read alone perfectly. He is to learn in a similar way in the presence of a third person, etc.

Further steps in developing confidence in spontaneous speech are taken by assigning topics concerning which the patient must say a few words.

For example, he is to make a few remarks about the furniture in the room, the weather this morning, the fine time he had last summer, the best way to reach his home, etc. For a somewhat more difficult exercise the instructor relates or reads an anecdote, a short story, a newspaper item, etc., and the patient is then required to give the gist in his own words. As a variation he may first read the material, and then tell about it. He may be required to give short accounts of what he has learned in school.

Still further confidence is developed by requiring the patient to stand up and deliver speeches, either those that have been memorized, or spontaneous ones on topics that are suggested. This is best accomplished with a group of stutterers. The group is said to represent, for example, a dinner at which each guest has to respond to a toast. Again, the group is a party of tourists on an automobile; one of the patients is the chauffeur; they all make remarks on the events of the journey. Again, the group is in a restaurant; one of the patients is the waiter, the others are guests, etc. Entire scenes are acted out, whereby spontaneous speech is constantly required. The inspiration of such a class is a potent factor in developing confidence.

More difficult situations are approached by imitating them first in the office. A table with objects represents a store. The patient buys and sells in the presence of people. When he can do this perfectly, the instructor goes with him to stores and helps in the buying. In like manner a ticket booth is arranged. For classroom work a class is organized and lessons in arithmetic, geometry, Latin, etc., are assigned, as may be appropriate. The patients are called up to recite, to demonstrate at the board, etc. Later the class is transferred to an actual classroom; still later outside instructors are brought in, older patients are appointed instructors, etc.

The special difficulty in telephoning is met by practicing at first on a private line between two rooms. The person at the other end represents "central" and the people called up. The stutterer should also practice the part of "central" in order that the real central may not appear so strange. When the patient no longer gets excited, the main line telephone is given to him, but the switch is held down so that there is no connection. Some one near by speaks as if he were "central." When the patient feels quite confident at such "dry telephoning,"

the switch is released and an actual call is sent. The instructor keeps close to the transmitter, so that at the slightest hesitation he finishes what the patient wants to say.

The outside situations are in general to be met by an attempt to get the patient's mind directed to the interest of the thing and not the manner of presenting it. For school it is desirable to go over the exercises with him beforehand, explaining and illustrating them in such a way that he becomes fascinated with the subject.

The appointment of stutterers as teachers of other stutterers in the office or in the clinic is very efficasious in developing confidence.

A very difficult abnormality of feeling that occurs in many stutterers is the mental cramp that occurs when they are suddenly called upon. The cramp of expectation in a mild degree is perfectly normal; for example, while waiting for cards or for dice to be shown, a normal person usually feels a slight flurry and holds his breath for a moment. With the stutterer this goes so far that at a knock on the door he will be struck absolutely speechless and be unable to call out. To meet with such a condition

games with dice, counters, etc., may be practiced; thereafter exercises are instituted in suddenly answering knocks, and in other situations that the patient describes as troublesome.

Confidence is also developed by increasing the loudness and carrying power of the patient's voice. He learns to speak in a full, resonant tone. Then he is removed to a distant room and forced to speak more loudly. The loud, resonant voice cannot be produced unless the speaker has a feeling of self-confidence; the cultivation of the voice thus develops the feeling directly. Moreover, a decisive, commanding voice causes those who hear it to attend in a more respectful way than they do to a hesitating, timid voice; this in turn produces more self-confidence in the speaker.

Readjustment to Environment

A very obstinate abnormality of feeling is the stutterer's altered appreciation of the relation of himself to his environment. It arises not only because he knows that he is abnormal in his speech, but also because the abnormality makes other people treat him differently. His feelings toward

other people are therefore very different from those of normal persons. This leads to an abnormal kind of life.

With some patients this condition has to be attended to from the start, because they make no progress and cannnot be cured except as the abnormality is mitigated. My method is as follows: I first attempt to establish intimate personal relations in the ordinary ways of acquaintanceship, so that the patient feels me to be his personal friend. As various incidents occur or as topics arise in conversation, we discuss the rules of conduct of the average man, and we condemn extremes. For example, a patient fears to go to a post office window because he stuttered when he was there before and he feels that the clerk expects him to stutter and will be impatient. It is pointed out that many hundreds of people have been to that window since he was last there, and that it is most improbable that the clerk would remember him. Again, the business of the clerk is to wait on all customers politely and patiently; he is trained to allow for the peculiarities of customers, some of which are more trying than stuttering. Again, he is not allowed by his em-

ployers to show the slightest impatience or discourtesy. Again, the postal clerk is in the service of the government of which the stutterer is a member; he is therefore the stutterer's employee. In this way the stutterer is brought to a correct understanding of the relations between himself and the clerk. The other situations in life are met similarly.

Readjusting the Subconscious

Recent psychological work has shown that the instincts and desires with which we are born are gradually modified and suppressed until they have become to a considerable extent unconscious. Moreover, our minds are trained to think along certain grooves and not to permit thoughts along other ones. Such a "censorship" makes it quite impossible, for example, for certain thoughts of love to arise in a European or an American girl that would be only the most natural thoughts for the negress in Africa. The person knows nothing about this "censorship"; it has been drilled into the mind until it governs without being realized. The difference in censorship permits certain thoughts to be perfectly natural in the one case and keeps

them entirely absent in the other. Yet, although absent from consciousness, the original natural forces persist with undiminished energy. When properly directed they produce the normal successful individuals; when improperly, they produce the group of diseases known as neurasthenia, psychasthenia, hysteria, some forms of insanity, etc. Our thoughts and emotions are controlled largely by the suppressed natural instincts. In a stutterer some of these instincts have gone wrong, and it is necessary to readjust them.

A minute analysis of the patient's mind, including the subconscious, is often necessary to a cure. The methods of psychanalysis furnish an outline of the patient's subconscious life. These methods may be applied to the stutterer in somewhat the following way: —

The patient is alone with the physician. The latter explains that the mind is an extremely complicated organ whose ways of action have to be learned by the most careful study. Since stuttering is accompanied by a somewhat incorrect action of the mind, it is necessary for the stutterer to carefully analyze his mental condition. The physician will

train him to do this. The training may take a long time.

We judge other persons and interpret their actions on the basis of our own ideas; our notions of other people are "egomorphic." The physician therefore asks the patient to note down from time to time any thoughts or criticisms that may occur to him concerning the physician personally. The patient may reply, for example, that just a moment ago he had said to himself that in spite of his age and calmness he couldn't help thinking that the doctor was really shy and bashful. It is pointed out to him that, utterly regardless of whether his judgment was correct or not, such a thought would probably not have occurred to a man of fearless disposition; the patient had sought out in the physician some signs of his own trouble. Of course this was not done consciously; the thought was merely the result of many past experiences and habits which he had forgotten, but whose traces remained to make up his character. The patient is warned not to try to produce the thoughts concerning the physician, but to note only what comes unpremeditatedly. The next day perhaps he says, with many apologies, that

the thought had occurred to him that the doctor was not always perfectly frank and honest with him; the reply is, "It is *you* who are not perfectly open and honest in your dealings; *you* have a tendency to get out of embarrassing situations even at the cost of some truth. Let your thoughts wander as they will, and see if you do not recollect a number of cases where you have acted in this way." These spontaneous revelations of traits of character strike the patient with great force and automatically start a readjustment.

During the day the restraints of life do not let our personalities come freely into play; we automatically suppress most of our thoughts and emotions and permit only a certain narrowly limited group to develop. Moreover, the "censorship" of the unconscious does not permit the suppressed instincts and desires to become known to us. In sleep, however, the censorship is somewhat relaxed, and our innermost ideas and feelings come forward in dreams. A study of the patient's dreams is, therefore, a most important source of information. The patient receives instructions to have paper and pencil beside the bed and to wake up and write

down immediately all dreams each night. The account is read off by him to the physician. The interpretation of some parts is immediately clear. When more information on any point is desired, the patient allows his mind to wander through a series of associations starting from the part of the dream involved; usually the explanation is forthcoming during such "running associations."

The following analysis of a patient's dream will illustrate the method. The record of the dream was: —

"I buy a ticket to some place, a single ticket because I am not coming back. At a certain station on the way I get off. I go to the manager's office, where I find two men at work over papers. I stand at attention, heels together in the German fashion. The man has an American military cap of dark blue. I say to myself, 'Shall I give a military salute or take off my hat?' When the manager turns around, I ask for the return of my money because I have found a patient on the train. The manager, who has now become a younger man, says 'Yes, but it will be dear; it will cost one fare plus a hemorrhage, plus an infarct.' I reply,

'Never mind, the expense is nothing to me.' The assistant reckons out what I am to get, and says it will be about fifty per cent."

The patient had originally been in doubt whether he should stop for treatment in this town or go to a physician farther off. Stopping at the nearer place, he had a few days before seen the doctor and his assistant (manager and clerk) at a scientific meeting. The doctor had told him he could not begin treatment till next week (he stands at attention waiting). The patient holds the doctor in great respect (the dream clothes him in a military costume, and makes him manager of the station). The doctor is, however, a personal friend; the two feelings are present at the same time and the patient doesn't quite know how to act (shall I give a formal military salute or take off my hat in a friendly manner?). The patient naturally expects the doctor to do him enough good to compensate him for what he loses by not going to the other place (I ask for return of my money for the part of the journey not taken). It is characteristic of dreams that the personalities are often changed. The patient now represents himself as a doctor who has found a patient on the train.

Instead of remaining the inferior (the patient), he for a moment gratifies himself by feeling that he is the superior (the doctor), who is about to treat a patient. The dream now notes that the doctor is younger than the patient (manager is now younger). The patient had been somewhat worried over the probable expense, and feared what the dream declares (it will cost you dear). On the previous evening the patient had discussed the matter with a friend, and had remarked that the journey was not entirely for the sake of the treatment (one fare), but also to learn the method; he had also complained that the treatment cost him part of the time he wished to give to some anatomical work (hemorrhage plus infarct). He had finally concluded that he was ready to pay any price if he could be cured (never mind, the expense is nothing to me). The fifty per cent seems to refer to the fact that the treatment was taking about half the time from some other work.

The further interpretation was made in connection with the rest of the treatment. A vitally important defect of the patient's character was an inability to properly and promptly understand his relations to other persons; the uncertainty as to

how he should approach another person expressed itself in the dream as the doubt concerning how he should greet the doctor. Another defect was a constant conflict between a naturally spendthrift nature and an acquired but annoying and ill-judged penuriousness; the whole dream consisted of questions of expense. This dream, as well as many others, expressed the patient's thoroughly egocentric view of the events of life. These defects of character were the sources of the patient's trouble, yet he had never suspected the existence of any one of them. As they were revealed by psychanalysis, a correction took place automatically.

The fundamental principles in interpreting dreams are (1) that the material of the dream is taken mainly from recent events, (2) that every dream expresses the fulfillment of a wish that has remained unfulfilled, and (3) that the language of the dream in adults is usually symbolical and not direct.

In children the language is not symbolical, and the dream shows itself at once as the expression of a wish. My niece, twelve years of age, had received some chickens which rather disappointed her on account of their smallness; the next morning she related a

dream of having a lot of fine, large Cochin-Chinas. Her dream had fulfilled her unsatisfied wish of the day before. In adults the language of the dream is sometimes also direct. It is not unusual for my patients to report that they dream of losing the paper given them to record dreams on, of seeing me tell them not to record dreams, etc. Upon being told that these are really wishes, they confess that the task of recording dreams is irksome to them.

Nearly always, however, the language of the dream is symbolic, and the patient sees no meaning in it. Many of the dreams of stutterers, however, have a common type.

One stutterer dreamed repeatedly that he was a great social success at parties, that he was a friend of the King of England, etc. Another one thought that he and a friend, playing with great exhilaration, had won a football game against an entire college eleven, whereby he had made brilliant runs and kicks that had brought applause from the grand stand. In all such dreams the stutterer represents himself as possessing an excess of coolness and self-confidence; that is, he puts himself into possession of just the qualities he lacks. It is also typical of stutterers'

dreams that they refer to their relations to other persons.

The method of "running associations" referred to above is intended to give the subconscious an opportunity to present its material. Why should my niece, in the dream related above, have thought of Cochin-Chinas? She was induced to talk about chickens; before long she came out with the memory of a former home where she had seen such chickens. The stutterer who won the football game was asked to let his thoughts wander freely. He gave the associations: "football game — crowd — class — Medical School — professor — Roosevelt — campaign," all of which referred to incidents where he had had difficulty in speaking. The friend who played with him was indistinctly seen; when asked what he thought of when the word "friend" was spoken, he replied, "doctor." The meaning of the dream was at once clear. With his friend the doctor to help his speech he was able to face a formidable crowd or a difficult situation and achieve success and applause. The wish that realized itself in the dream was that with the doctor's help he might get over his stuttering and be able to conduct himself

in his speech so brilliantly that he could successfully face his class and all other situations that might present themselves.

As the peculiarities and deformities of character of the stutterer present themselves spontaneously in the dreams and in the discussions, he learns to see them himself and gradually to correct them. This is usually more efficacious than any attempt of the physician to directly point out the defects. The psychanalysis need not go so far as in the treatment of hysteria; it has, moreover, the distinct advantage that every such revelation of his own character to himself produces greater ease in the stutterer's speech. The results of the treatment show themselves gradually and steadily.

PART II

LISPING

CHAPTER I

INTRODUCTION

Owing to the fact that the symptoms are so often the same or similar, it is convenient to include under "lisping" several different speech disorders whose characteristics lie essentially in defects of enunciation. We may distinguish four different lisping disorders; namely, negligent lisping, organic lisping, neurotic lisping, and cluttering.

The use of the word "lisp" in this larger sense is in accord with the original Anglo-Saxon "wlisp" and with the use in literature. "To lisp in numbers" (Pope) refers to baby talk, of which negligent lisping is the survival.

In discussing individual sounds it is desirable to have an alphabet. The following list gives the chief sounds of English with a phonetic alphabet in parentheses ( ) to indicate them, and with examples in

ordinary spelling. In the discussion of lisping I have as far as possible avoided the phonetic alphabet and have given illustrations in ordinary English spelling.

Phonetic Letter	Example	Phonetic Letter	Example
ɑ	*ah*, f*a*ther	f	*f*erry
æ	f*a*re	v	*v*ery
e	d*a*te	s	*s*o, dose
ɛ	d*e*bt	z	*z*one, doze
ə	h*er*, further	ʃ	*sh*ow
ʌ	m*u*ch	ʒ	a*z*ure
i	p*ee*l	θ	*th*in
ɪ	p*i*ll	ð	*th*ine
o	p*o*le	c	*ch*ew
ɔ	P*au*l, poll	ɟ	*j*ew
u	p*oo*l	y	*y*ou
ʊ	p*u*ll	m	*m*ow
p	*p*ar	n	*n*o
b	*b*ar	ŋ	si*ng*
t	*t*oe	ɹ	*r*ow
d	*d*oe	l	*l*ow
k	*c*ar	w	*w*oe
g	*g*o	h	*h*oe

The variations from the type are manifold, but finer distinctions are not useful here. We may note, however, that the first half of the diphthong in

"fly" is not exactly the sound indicated by (ɑ) but a somewhat different one that we may indicate by (a).

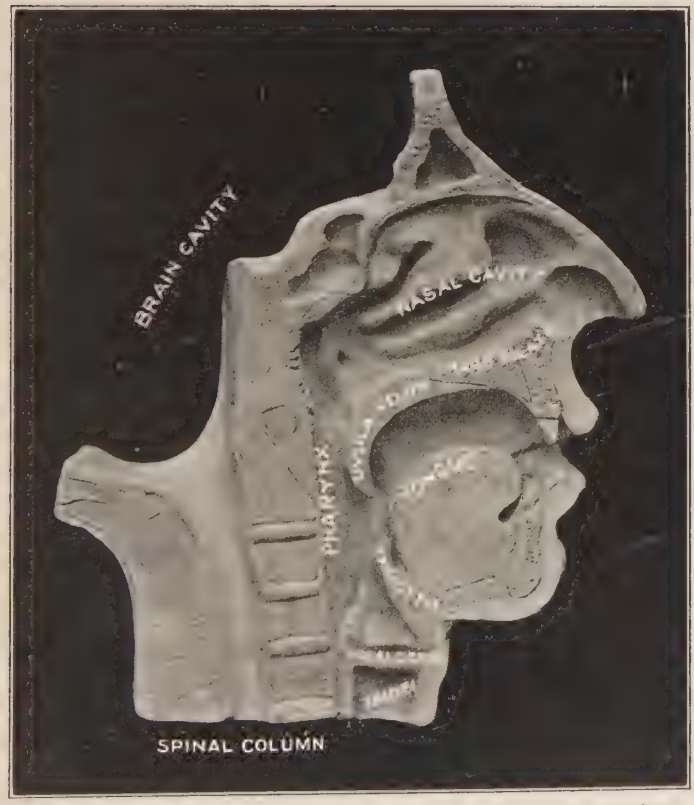


Fig. 39. — Median section of the organs of enunciation and phonation.

The various sounds are produced by different adjustments of the vocal organs. Fig. 39 gives a median section through the vocal organs of the head. The

larynx is just in front of the backbone and just below and behind the tongue. The roof of the mouth is formed by the hard palate, at the rear of which is the velum (soft palate) with the uvula hanging down. The nasal cavity extends from the nostrils in front to the pharynx in the rear. Median sections for the typical English sounds are given in Plates I, II, and III at the end of the volume. The heavy line at the larynx indicates that the larynx vibrates during the sound; the dotted ring indicates that it does not.

FIG. 40. — Artificial palate.
A thin plate of aluminum is made for the roof of the mouth. It is dusted with chalk and placed in the mouth. When a sound is produced, the tongue wipes off the chalk where it touches the palate.

When the mouth is widely opened and properly illuminated, the positions of the tongue and velum can be observed in a mirror.

The contact of the tongue with the hard palate in producing sounds may be studied by palatography.

The tongue or the roof of the mouth may be painted with ultramarine water color. The desired sound is spoken. The contact of the tongue with the palate is seen where the color is wiped off.

For more extensive recording a cast of the roof of the person's mouth is made, either with dental modeling compound or with plaster. From this a dentist makes a thin artificial palate or dental plate of vulcanite, aluminum, silver or gold (Fig. 40).

FIG. 41. — Palatogram for the vowel "ee." The black areas show where the tongue touched the palate.

An artificial palate may be made of eight or ten sheets of wet tissue paper. A sheet is pressed over the mold; paste is spread over it, and another sheet is pressed on, etc. It is carefully worked into the depressions of the mold by the fingers. When it is perfectly dry, it is coated with black varnish.

For an experiment the inner surface of the artificial palate is slightly oiled and sprinkled with powdered

chalk. It is inserted in the mouth; the sound is spoken and the artificial palate is removed. The parts touched by the tongue appear black, the chalk having been removed where the tongue touched it. The results may be photographed, painted on a cast, or sketched on paper. Such a palatogram on a cast for the vowel "ee" is shown in Fig. 41. Palatograms for typical English sounds are given in Plate IV at the end of the volume.

The sounds (ɑ, æ, e, ɛ, i, ɪ, o, ɔ, u, ʊ) are termed "vowels." For all of them the lips are more or less opened. When the vowel "ah" is sung before a mirror, the velum can be seen to rise upward and backward; this clears the passage from the throat to the mouth, and cuts off the passage from the throat to the rear of the nasal cavity. The velum rises likewise for all the vowels. If the finger is placed on the front of the neck over the larynx while the vowels are sung, the vibrations of the voice will be felt during all of them. Observations in a mirror show that the vowels differ in the positions of the lips and tongue.[1]

[1] It has been proven that the laryngeal adjustments also differ for the various vowels. Scripture, Researches in Experimental Phonetics, 116, Carnegie Institution Publication No. 44.

The "occlusives" (p, b; t, d; k, g) are made by closing the mouth passage at some place. The closure occurs at the lips for the "labial occlusives" (p, b). The closure at the front of the tongue for (t, d) and at the back of it for (k, g) causes them to be called "front" and "rear lingual occlusives," respectively. In English an occlusive usually ends with release of the contact before the breath ceases, producing a sharp puff of air. The English occlusives are therefore termed "explosives."

For the sounds (f, v; s, z; ʃ, ʒ; θ, ð) a channel permits a current of air to issue with a rushing or hissing effect; they are called "fricatives." The sounds (f, v) are "labial fricatives"; (s, z; ʃ, ʒ; θ, ð) are "front lingual fricatives"; there are no rear lingual fricatives in English.

For (ɹ) the tongue leaves a moderately large opening at the front; for (l) the opening is at the sides; for (w) the small opening is at the lips; the opening is not so large as in the vowels and not so small as in the fricatives; no term for grouping these sounds has yet been introduced. For (h) there is a narrow opening at the glottis.

For the sounds (č, ɹ) there is occlusion by the top

of the tongue during the first portion and a rush of air through a narrow channel for the second portion. It has been proposed to consider them as double sounds (tʃ, dʒ), but experimental records show vital differences; the two elements of occlusion and friction are so closely united in (č, ǰ) as to make them single sounds. Moreover, the positions of the tongue, jaw, and lips are different from those of (t, d) and (ʃ, ʒ), as may be seen in Plate I.

During (m, n, ŋ) the nasal passage is open, hence the term "nasal."

During (p, f, t, k, s, ʃ, θ) the larynx does not vibrate; these consonants are called "surds." During (b, v, d, g, z, ʒ, ð) the larynx vibrates; they are called "sonants." The sounds (m, n, ŋ, ɹ, w) are nearly always sonants. The sound (h) is usually surd, but sometimes sonant. All whispered sounds are surd.

The vertical diagrams and palatograms for the consonants are given in Plates I, II, and III at the end of this volume. The dotted line over the larynx indicates that it does not vibrate for the surds; the heavy line indicates that it does for the sonants.

The breath indicator shown in Fig. 42 may be used

FIG. 42. — Candle flame indicator used for the mouth.
According as air issues or does not issue from the mouth, the candle flame bends or stands upright.

to illustrate the properties of many sounds. The tube from the mouth is directed against a candle flame. When the vowels are spoken into the mouth-

FIG. 43. — Tambour indicator used for the nose.

The indicator is made from a thistle funnel covered with rubber. A piece of card hangs in front of the rubber and is fastened to it by glue or wax. Air issuing from the nose moves the card flap. A mouthpiece may be used, as in Fig. 42.

piece, the flame is deflected. The same is true of the fricatives. During the occlusives the flame is upright, but it is sharply deflected by the explosions at the ends of the occlusions.

The breath indicator shown in Fig. 43 consists of a thistle funnel over the top of which thin rubber is stretched and tied. A strip of visiting card is cut across and joined with tissue paper to make a hinge. A piece of wax holds one piece of the card to the funnel, while the other one hangs in front of the rubber membrane. A drop of paste connects the hanging flap to the membrane. The funnel is connected by a rubber tube to a nasal tip. When any air issues from the nose, it goes into the funnel and moves the rubber membrane; the movement is indicated by the flap. This indicator can be used with a mouthpiece like the one in Fig. 42.

The examination of a person with incorrect enunciation should cover the typical sounds. Each consonant may be spoken with the vowel "ah" after it or in some typical word; the list on p. 112 may be used.

Although the patient may be able to speak the separate sounds correctly, he may mumble and confuse them in ordinary talking.

CHAPTER II

NEGLIGENT LISPING

In order to produce speech sounds like those of other people an individual must hear correctly what other persons say; in order to move his speech organs correctly he must feel their movements and hear the sounds he himself produces. By long experimentation the infant acquires the art of talking like other people. If, however, the child is careless or negligent in his observation of the speech of other people or himself, he fails to produce the sounds properly and he does not even notice his errors.

Fig. 44. — Lip position for "f" and "v."
The lower lip is brought against the upper teeth.

These are the characteristics of "negligent lisping," or "functional lisping." The essential pathological fact is mental carelessness. The cure consists in teaching the patient to carefully correct his faults.

If the cure is neglected, some children may become nervous about their speech and turn into neurotic lispers (see Chapter IV); as this trouble is a much more serious one, it is not safe to neglect negligent lisping. In other children the ridicule of their comrades and the reproof at home may produce a true hysteria with symptoms of disturbance of mind (emotional complexes) and body (loss of pharyngeal and corneal reflexes, etc.).

FIG. 45. — Lip position for "w." The lips are projected slightly forward with a small opening.

Occasionally a defective speech organ produces a defective sound (organic lisping), which so confuses

the child that all his sounds become incorrect (negligent lisping).

Lip Defects

Some persons use "v" for "w," as in "Samivel Veller" for "Samuel Weller." For "v" the lower lip should be against the upper teeth (Fig. 44); for "w" the two lips are brought near each other (Fig. 45). To correct the fault, the patient is told to say "well, word, wind," etc. Just as he starts to say "vell, vord, vind," etc., his lower lip is pressed down with a finger or a stick; he is thus forced to say "w" instead of "v."

FIG. 46. — Lip position for correcting "w" into "v."
The lower lip is caught between the teeth when a "w" is to be spoken.

The opposite defect may occur. The patient says "werry" for "very," "wote" for "vote," etc. He

is told to bite his lower lip when trying to say words beginning with "v" (Fig. 46).

The use of "p" for "f" and "b" for "v" arises from pressing the lips too tightly together. A thick

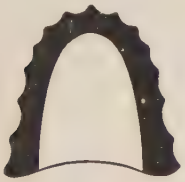


FIG. 47. — Palatogram for forward "t" and "d."

FIG. 48. — Palatogram for backward "t" and "d."

FIG. 49. — Palatogram for "k" and "g."

stick or a finger is stuck between the lips so that they cannot close tightly. This produces the fricative

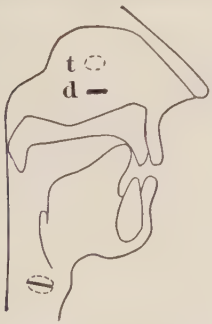


FIG. 50. — Mouth diagram for "t" and "d."

The front of the tongue is raised against the hard palate just behind the teeth.

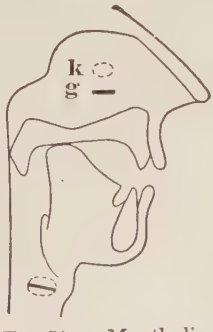


FIG. 51. — Mouth diagram for "k" and "g."

The back of the tongue is raised against the velum at the rear of the hard palate.

sound. The differences are also learned by observation of the instructor and looking at one's self in

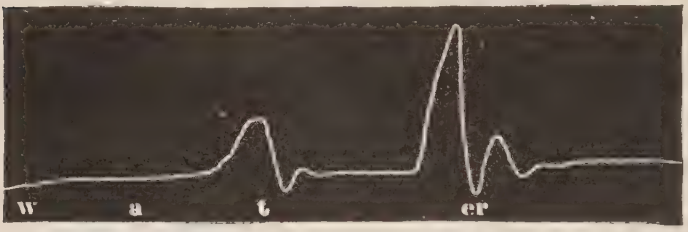


Fig. 52. — Mouth record of "water" spoken normally.
The sudden and complete cutting off of the breath during the "t" and the strong explosion at its end are evident.

a mirror. The differences may be made apparent by a breath indicator (p. 119).

The substitution of "s" and "z" for "f" and "v" rests upon the likeness in the fricative sound. Atten-

Fig. 53. — Mouth record of "water" spoken by a lisper.
Instead of the breath being cut off for the "t," there is only a faint diminution; the sound is like "th" instead of "t." The laryngeal vibrations are continued from "a" without stopping through the "th" into the vowel "er." A correct "t" has no laryngeal vibrations.

tion is called to the fact that in words with "f" and "v" the lips are closed, while in the words with "s" and "z" they are open.

Defects of "t," "d," "k," and "g" (t, d, k, g)

For "t" and "d" the front of the tongue is raised against the palate just behind the teeth (Figs. 47, 48, 50); for "k" and "g" the rear part is raised (Figs. 49–51). For "t" and "d" it is usual to turn the tip of the tongue upward as in Fig 47. Many persons form the "t" and "d" by putting the tip farther back against the palate (Fig. 48).

One defect in "t" and "d" is failure to completely close the air passage by the tongue. An additional defect for "t" is failure to stop the laryngeal vibrations when the sound occurs between vowels. The two defects are illustrated by graphic records taken with the mouth recorder (Fig. 7).

A normal curve of "water" as recorded by the graphic method is given in Fig. 52. A slight rush of the breath is followed by a nearly straight line indicating the faint sound of "w." The mouth opens rather suddenly and the line rises as the vibrations of "a" rush out. The breath is cut off completely during the "t." As the tongue releases the "t," a strong puff of air occurs and the line goes sharply upward. The record ends with the final vowel. The record for a lisper is shown in Fig. 53. Where there

should be a straight line with an explosion for the "t," there are strong vibrations with only a slight sinking of the line. This shows that the larynx did not stop during "t" and that the tongue did not close the air passage. The patient says "wather" (wəðə) instead of "water" (wətə).

The chief fault is the failure to close the tongue tightly at the front. Ordinarily it is sufficient to explain to the patient that there are two classes of sounds called "occlusives" and "fricatives." For the occlusives the current of air passing through the mouth must be cut off at some point; for the occlusives "t" and "d" the tip of the tongue must close firmly against the palate. When it does not do so, it produces the fricative sound "th." The other defect, namely, keeping the larynx vibrating, disappears when the "t" is carefully made.

A frequent defect among children is the use of "t" for "k," as in "tandy" for "candy." Sometimes this substitution occurs regularly; usually it is only in some words. The patient who says "tandy" will usually say "car" correctly. That is, although he is able to make the sound of "k," he replaces it by "t" in some words through pure negligence.

Both "t" and "k" are occlusives, that is, the current of air is shut off entirely during the sound; the patient does not take the trouble to distinguish between them. A similar substitution is made of "d" for "g" (hard "g" as in "go"). The child says "Div me sum tandy." The cure may begin by having him open his mouth wide and say "ca-ca-ca-candy." He looks into the mouth of the instructor and sees that the tongue rises in the back; looking into a mirror, he learns how his own tongue is to move.

It is sometimes useful to push the point of the tongue back and down by a stick (tongue depressor) when a word beginning with "k" or "g" is used. The child cannot say "t" or "d," and he is forced to raise the tongue at the back.

Similar procedures are used if "k" and "g" are replaced by other sounds.

Defects of "s" and "z" (s, z)

To produce "s" or "z" the front of the tongue is raised against the hard palate behind the teeth, while a small channel is left in the middle so that a jet of air is blown through. A palatogram is shown in Fig. 54, a mouth diagram in Fig. 56. Every modi-

fication in the shape of this channel changes the character of the hissing sound. For "z" the vocal cords vibrate; for "s" they do not.

Fig. 54. — Palatogram for "s" and "z."

The hiss for the "s" is frequently too weak, the channel being too wide. The defect is corrected by using greater pressure of the tongue. When the hiss is too sharp, relaxation is taught.

The most frequent defect is that whereby the patient says "toap," "toup," "tun," etc., for "soap," "soup," "sun," etc., or "dink" for "zinc." Instead of a rush of air during "s" there is complete stoppage; the "fricative" sound is turned into an "occlusive." Through negligence the person presses his tongue against the palate a trifle too hard when saying "s" or "z." This closes the opening that is necessary for "s" (Figs. 54, 56), and makes an occlusive (Figs. 55, 57) that sounds like "t." This may be shown by graphic records (p. 22) by means of the mouth recorder (Fig. 7). A normal record for "sun" is shown in Fig. 58; a

Fig. 55. — Palatogram for occluded "s" and "z." The tongue touches the palate over a larger area than in Fig. 54. The channel is closed by too much pressure.

record with the occlusive instead of the "s" is given in Fig. 59.

With a small rubber bulb placed between the front of the tongue and the palate (Fig. 5), and connected to a registering apparatus (Fig. 3), the force of the pressure of the tongue can be recorded. For an occluded "s" it is greater than for the ordinary "s" or for "t" (Fig. 60). The occluded "s" is thus not the same as a "t"; it may be defined as an "s" made with excessive tongue pressure resulting in a sound like "t."

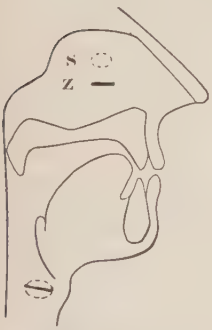


Fig. 56. — Mouth diagram for "s" and "z."

The front of the tongue rises so as to form a narrow channel at the front of the palate.

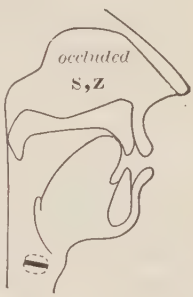


Fig. 57. — Mouth diagram for occluded "s" and "z."

The channel of Fig. 56 is closed by too much pressure.

Treatment by having the patient imitate the "s" of a normal person usually aggravates the defect; he is already making too much effort with his tongue, and the more he tries, the greater the effort he makes. Sometimes he can be taught directly to relax the tongue, but this rarely succeeds.

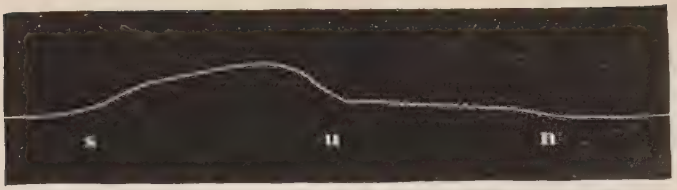


FIG. 58. — Mouth record of "sun" spoken normally.
The record was made as shown in Fig. 7. The rising line registers the air issuing during "s"; this is followed by the vibrations for "u" and "n."

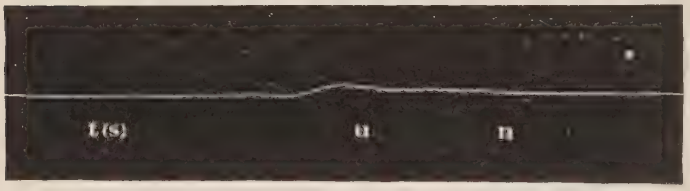


FIG. 59. — Mouth record of "sun" spoken by a lisper.
The record was made as shown in Fig. 7. The straight portion of the line shows that no air issued during the attempt at "s."

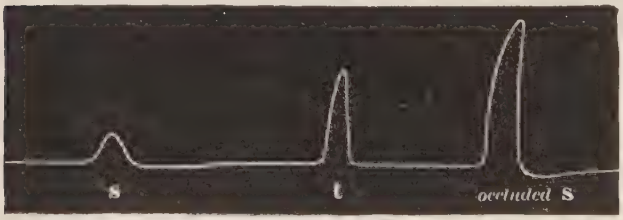


FIG. 60. — Tongue record for occluded "s."
A record by the method of Fig. 5 shows that the pressure of the front of the tongue against the palate is small for "s," larger for "t," and largest for occluded "s."

One cure consists in inserting a probe, an applicator, a toothpick, or a pencil just over the middle of the tongue and pressing it down as the person

begins to speak a word beginning with "s" (Fig. 61). He cannot close the passage completely, and instead of saying "t" he is forced to say "s." This catches his ear, and he notices the difference in sound. Constant repetition enables him to train his tongue in the new way.

FIG. 61.—Correcting occluded "s" and "z."

The small stick over the front of the tongue produces the channel necessary for "s" and "z."

Another cure consists in practicing the patient in making a sound with a sharp hiss.

For other cases a breath indicator (Figs. 42, 43) is effective.

Frequently the "s" and "z" are made with channels at the sides instead of the front. The hiss sounds like an "l"; instead of "soap," "soup," the patient seems to say "sloap" and "sloup." The defect is corrected by teaching a correct "s," either by imitation of the sound as

heard by the ear or by using a stick over the middle of the tongue, as in the case of occlusive "s" and "z"; the patient will close up the side channel as soon as one is made in the middle.

Fig. 62. — Making the interdental fricative.

The tongue is pushed out between the teeth. The sound resembles that of "th."

Sometimes the "s" and "z" are made in a way that produces sounds like "sh." For "sh" the channel in the middle of the tongue is seen to be broader and differently formed when compared to that for "s." The cure is often brought about by using a probe or a stick as in the previous case; the irritation makes the patient narrow the channel. Sometimes it is necessary to train the patient to use "t" instead of "s," and then to correct this fault as previously described.

Sometimes a "th" sound is used for "s" and "z."

The patient who has this fault usually sticks his tongue between the teeth for "s" (Fig. 62), making an interdental fricative not used in English. Sometimes it is sufficient to show him that people do not stick their tongues out that way. He then watches his own tongue in a mirror. He also learns to make "s" with the teeth tightly closed. A small stick can also be used, as in "t" for "s."

The patient who uses "f" for "s" is satisfied with the fact that he is producing a fricative sound; he notices no difference. He must be taught to distinguish between the two kinds. He is to watch his lips in a mirror; he sees that the lower lip does not close against the teeth for "s." His lips may be held open while he is obliged to say "s."

A similar case is that where a guttural fricative (like the German "ch" in "ich") is used for "s." The formation of "s" is to be explained and taught.

Occasionally an utterly different sound, such as "k," is used. If the correct "s" cannot be taught directly, the "t" is taught and then this corrected to "s" as described above.

Defects of "ch" and "j" (č,ǰ)

The sounds "ch" and "j," as in "church" and "judge," have been considered as consonantal diphthongs, each made up of two sounds, "t" with "sh"

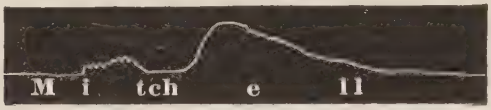


Fig. 63. — Mouth record of the word "Mitchell."
The faint vibrations for "m" are followed by stronger ones for the vowel "i." The air current is cut off entirely for a short time thereafter; this is the occlusion for the sound "ch" ("tch"). Thereafter the rather quick and strong rise of the line indicates an explosion of special form. The record ends with the vibrations for "e" and "ll."

and "d" with "sh." Graphic records of the sounds "ch" and "j" have proven that they are two inde-

Fig. 64. — Mouth record of the word "nutshell."
The faint vibrations for "n" are followed by stronger ones for the vowel "u." The air current is cut off for "t," which has no explosion here. This is followed by gradual rise of the line for the fricative sound "sh." The word ends with the vibrations for "e" and "ll."

pendent sounds.[1] A record of the word "Mitchell" (Fig. 63) shows the sound "ch" — spelled "tch" here — to be an occlusion followed by an explosion of a

[1] Winifred Scripture, "The sounds of 'ch' and 'j,'" *Popular Science Monthly*, October, 1911.

special form that is never seen in any other typical sound. A record of the word "nutshell" (Fig. 64) shows an occlusion for the "t" without any explosion, followed by a long rush of air for the "sh." The sound "ch" (č) is thus quite different from the combination of the sounds "tsh" (tʃ).

The difference between the two sounds can be shown in another way. A palatogram for "ch" or "j" shows that the tongue touches the palate farther back than for "t" or "d," and that it covers a bigger space (Fig. 65).

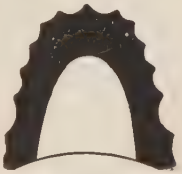


Fig. 65. — Palatogram for "ch" and "j." The tongue touches the palate over a larger area than for "t" and "d."

The mouth diagram is given in Fig. 66. The front of the tongue touches the palate rather far back; the lips are somewhat protruded. The differences from "t," "d" are marked (Fig. 50).

The establishment of the fact that "ch" and "j" are individual sounds is analogous to the proof furnished long ago that the two forms of "sh" (ʃ, ʒ) are individual sounds, and not compounds of "s" and "h."

The typical defects are of two kinds. In one the

tongue presses too tightly against the palate, in a way similar to that for an occluded "s" (p. 130). The sound is like a "t" for "ch" and a "d" for "j." In the other the tongue is not pressed tightly enough. This produces a sound resembling "sh." The treatment for the former is similar to that for the occluded "s" (p. 132), the purpose being to obtain relaxation of the tongue. For the latter the patient is told to press the tongue more strongly.

FIG. 66. — Mouth diagram for "ch" and "j."
The tongue touches the palate over a larger area than for "t" and "d"; the lips are projected forward, and the teeth are rather close.

Defects of "n" and "ng" (n, ŋ)

For "n" the tongue takes the same position as for "t" and "d" (Fig. 50), but the velum is not raised (Fig. 67). For "ng," as in "sing," the tongue position is like that for "k" (Figs. 49, 51) with the velum not raised (Fig. 68).

The use of "m" for "n" (the lip nasal for the front tongue nasal) is corrected by observation in a mirror, by making the patient open his lips while saying "n," etc. The use of "t" or "d" for "n"

is a velar defect; it is corrected by exercises in raising the velum as described under Velum Defects below. The sound "n," namely, the nasal with forward contact of the tongue, is sometimes used for "ng," the nasal with rear contact, as in "good

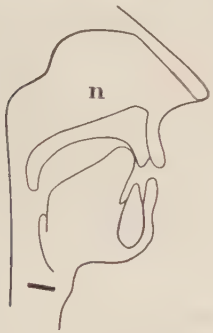


FIG. 67. — Mouth diagram for "n." The tongue touches the palate at the same place as for "t" and "d." The velum is lowered.

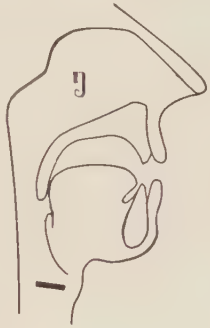


FIG. 68. — Mouth diagram for "ng." The velum is lowered and the back of the tongue is raised slightly to meet it.

mornin" instead of "good morning." The confusion is aided by the lack of any English letter for the sound "ng." The correction is made by calling the patient's attention to the difference and by making him open his mouth widely while making the "ng" in such words as "sing," "ring," "bring," "calling," etc. The "ng" in words like "finger" consists

of the two sounds "n" and "g" and not of the single sound "ng" (ŋ).

Defects of the Two Forms of "sh" (ʃ, ʒ)

The two sounds indicated by "sh" are made by raising the front of the tongue so as to cut off all breath except through a small channel (Figs. 69, 70). For (ʃ) ("sh" as in "azure") the larynx vibrates; for (ʒ) ("sh" as in "show") it does not.

Fig. 69. — Palatogram for "sh." The tongue touches the palate along the sides and leaves a larger opening in front than for "s."

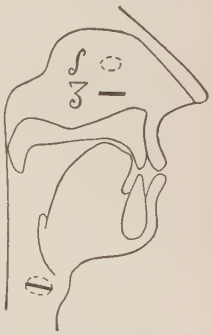


Fig. 70. — Mouth diagram for "sh." The tongue is raised against the palate over a broad area further back than for "s." The channel is longer.

Sometimes the pressure of the tongue is too weak; the channel is too large, and the "sh" sounds faint and hollow. The defect can be corrected by emphasizing the tongue pressure.

Sometimes the contact is so weak and incorrect that the resulting sound is more like "th." The tongue is to be pressed with more force.

When the sound "s" is made instead of "sh," it

indicates that the child does not properly distinguish between them. He is to be drilled in careful pronunciation of words with such sounds.

Fig. 71. — Palatogram for "th." The tongue touches the palate in front over a broad space so lightly that air escapes.

It occasionally happens that "f" is used for "sh." Just as with "f" for "s" (p. 135), he is taught to distinguish them, and his lips may be held apart. For the rare "t" for "sh" a procedure like that of "t" for "s" may be tried.

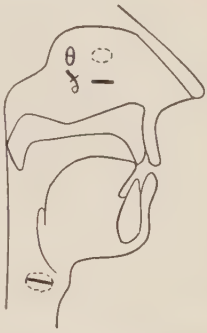


Fig. 72. — Mouth diagram for "th." The front of the tongue is raised against the palate, but a very wide channel is left.

Defects of the Two Forms of "th" (θ, ð)

In producing the two sounds indicated by "th" the front of the tongue is raised against the palate (Figs. 71, 72), the tip touching so lightly that the air escapes over it. For "th" as in "thin" the larynx is silent; for "th" as in "thine" it produces a tone.

It is very common for children to use "t" and "d" for "th"; thus, they say "tin," "tree," "tumb"

for "thin," "three," "thumb," and "dis," "dough," "dee" for "this," "though," "the." It is like the language of the loafer or the tough: "Are you wid me? Yes, trou' tick and tin."

FIG. 73. — Mouth record of "thin" spoken normally.

The rising line shows that during "th" the air issues from the mouth in a steady stream. The small vibrations are from the vowel and "n."

The defect arises from pressing the tongue too tightly, with the result that no air can issue from the mouth; this makes an occluded "th" that sounds like a "t" or a "d."

A mouth record (Fig. 7) of the word "thin" spoken normally is given in Fig. 73; it is very clear that air issues from the mouth during the "th." A record of the same word spoken by a lisper is given in Fig. 75; the first sound was evidently an occlusion with an explosion similar to the first sound in "tin" (Fig. 74).

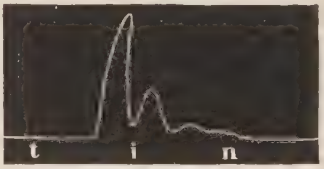


FIG. 74. — Mouth record of "tin" spoken normally.

The straight line indicates the occlusion of the "t"; the sharp upward movement is the result of its explosion. The small vibrations are from the vowel and "n."

The cure consists in inserting a probe or a stick at

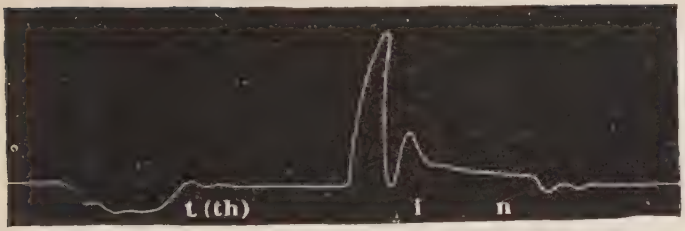


FIG. 75. — Mouth record of "thin" with occluded "th," by a lisper.

The sudden depression of the line at the start indicates a strong jerk of the tongue whereby air is drawn in for an instant. The straight line indicates that the tongue is held tightly against the palate. The sudden upward jerk is the explosion of the occluded "th." The occluded "th" is longer than the normal "th" or "t"; this is a result of the excessive effort. Its explosion is stronger than that of "t."

the side of the mouth above the tongue (Fig. 76). When the patient tries to say "t," his tongue is pressed down across the tip and he is forced to say "th." It is also useful to teach the use of the interdental fricative (p. 134) as a substitute for the defective "th." The breath indicator is often effective (Fig. 42).

FIG. 76. — Correcting occluded "th."

A stick is held across the front of the tongue, so that it cannot be pressed tightly against the palate.

Children often use "f" and "v" for "th," substituting one fricative for another. The defect is explained to the patient. He is to observe in a mirror that for words like "thin," "thimble," "this," "though," etc., the lips remain apart. If necessary,

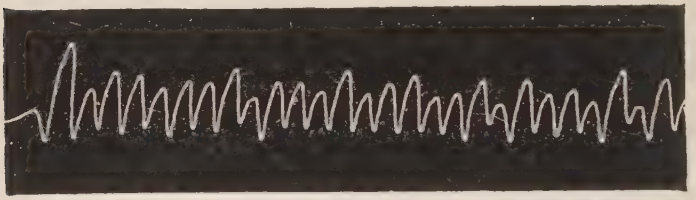


Fig. 77. — Mouth record of front rolled "r" by an American.
The larger vibrations result from the flapping of the tip of the tongue; the very fine vibrations are the record of the laryngeal vibrations, that is, of the tone of the voice.

the lower lip may be held down by a stick or the finger.

Defects of "r" and "l" (ɹ, l)

The original sound from which English derives its "r," as in "run," was the rolled or trilled "r," which is indicated phonetically by (r). The rolled "r," which is no longer used in English, is the only one in German, French, Italian, and most other languages. To produce the rolled "r" with the point of the tongue, its front portion is pressed against the palate tightly except at the point. The pressure of

the breath causes the point to flap. A mouth record by the apparatus shown in Fig. 7 is given in Fig. 77.

FIG. 78. — Palatogram for English "r."

The side and front of the tongue are raised; the channel in the middle is wider than for "sh," but not so wide as for the vowels.

In English "r" the tongue position is the same, but the point is held away from the palate (Figs. 78, 79); there is no flapping or rolling. A mouth record of "sorrow" (Fig. 80) shows small vibrations for the "r" like those of a vowel. The phonetic letter is (ɹ).

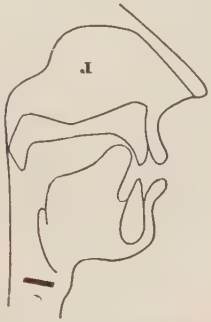


FIG. 79. — Mouth diagram for "r."

The front of the tongue is raised against the palate, but the tip does not quite touch it.

In large cities like Berlin and Paris, and regularly

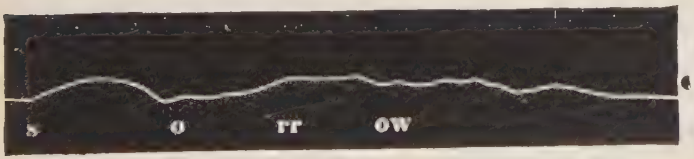


FIG. 80. — Mouth record of English "r."

The record is of the word "sorrow." The rising line at the start indicates the air issuing during the "s." The small vibrations are those of two vowels with "r" between them. The vibrations for "r" do not differ from those for the vowels except in minor details.

in Yiddish, the rolled "r" is produced by forming a groove in the rear of the tongue in which the

uvula is allowed to rest. The breath causes the uvula to vibrate. A mouth record is shown in Fig. 81. The phonetic letter is (R).

FIG. 81. — Mouth record of uvula "r" by a Parisian.
The larger vibrations result from the flapping of the uvula; the finer ones are the record of the laryngeal vibrations, that is, of the tone of the voice.

For "l" the tongue is tight in front and open along the sides (Figs. 82, 83).

FIG. 82. — Palatogram for "l."
The tongue touches the palate at the front, leaving free passage at each side.

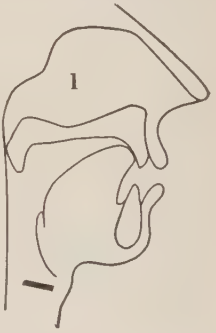


FIG. 83. — Mouth diagram for "l."
The front of the tongue touches the palate.

The most common defect in English is the use of the easy sound "w" for the difficult sound "r." The cure consists in getting the tongue in the right place for "u." One method is to teach the rolled "r"; the rolling is to be done with the tip of the tongue. When the patient can talk with the rolled "r," he simply

drops the roll while using the same tongue position. When the person cannot get the tongue right for the rolled "r," it is useful to use another sound that requires the point of the tongue against the palate. For example, he is told to repeat "sun, run, sun, run," etc., or "tun, run, tun, run," etc.

Fig. 84. — Rod for pushing the tongue. The rod is made of an aluminum applicator (twice the size of the figure).

Fig. 85. — Pushing the tongue into position for "r."
The rod pushes the front of the tongue up and back.

In more difficult cases the patient observes the tongue of another person saying "r." He finds that it touches the teeth along the sides, but is free in front; this is particularly clear when the "r" is rolled. With a mirror he tries to get the same position.

The instrument shown in Fig. 84 is made by

bending a light wire (aluminum applicator). With it the front of the tongue can be pushed upward and backward into the position for "r" (Fig. 85).

Sometimes "l" is used for "r." It is like the Mongolian lisp used by the Chinaman, who says "Melican man here light away." The patient is shown that for "l" the tongue is open along the sides while tight at the tip. The action is thus the reverse of that for "r." For the correction of this obstinate defect the tongue is drawn back into the mouth so that it cannot be released at the sides; the point is turned up. A flat stick or a small rod (aluminum applicator) bent to the form shown in Fig. 84 may be put under the tongue to push it back and up.

Children of foreign-born parents sometimes use the lingual or uvular rolled "r" instead of the smooth English "r." Their peculiarity may be illustrated as follows: "Rrrobert makes a rrring arrround it" or "RRRobert makes a RRRing ARRRound it" instead of "Robert," etc. It is usually sufficient to teach the difference by ear between the English "r" and the rolled "r." For more difficult cases a breath recorder (Fig. 7) may be used; the indicator makes

a steady movement for the English "r," while it vibrates heavily for the rolled "r."

The "r" may be omitted or replaced by other sounds, as "n," "t," "w," etc. The use of "w" for "r" is very frequent; the child is sometimes encouraged to say "vewy," "pwetty," etc., because it sounds "cute." Both tongue and lips take the positions for "w" instead of those for "r" (Plate II). Even when the tongue is in the position proper for "r," the lips may have the position for "w." This makes a peculiar "r" with a "w" tinge. These defects are to be corrected by teaching the patient to make exaggerated or rolled "r"s. Words are recited with exaggerated "r"s, rolled and not rolled. The lower lip may be held down to hinder the "w" movement.

The usual defect for "l" consists in the use of an "r" or in dropping the "l." In both cases the cure consists in imitation or in explanation with observation of the tongue. In order to enforce the fact that the tongue must touch at the tip for "l," it is useful to draw the tongue back and then throw the tip sharply into place against the palate as an initial "l" is to be pronounced.

If a nasal sound is used for "l," the correction is to be made by pinching the nose, by the nasal indicator, etc., as described under "Velum Defects."

Velum Defects

For all English sounds except the nasals "m, n, ng," the velum, or soft palate, must rise so as to close more or less completely the passage from throat to nose. When this is not done, the speech has a dull, nasal snorting character.

The vowels may be tested by the following list: for "ah" (ɑ), "ah, arm, art"; for (æ), "at, after, am"; for "aye" (e), "aid, ate, ale"; for "eh" (ɛ), "ebb, effort, egg"; for "ee" (i), "eel, eat, easy"; for (ɪ) "it, in, ill"; for "oh" (o), "old, owe, oak"; for "awe" (ɔ), "awe, awful, ought"; for "oo" (u), "fool, boor, tool"; for (ʊ), "full, pull, bull."

The occlusives may be tested by the words "ape, pa, upper; able, bee, obey; at, tar, utter; add, do, odor; oak, caw, ochre; egg, go, ago."

The fricatives may be tested by the words "eff, fare, offer; eave, veal, ever; ess, see, essay; ease, zee, easy; shoe, ash, usher; azure, pleasure; thin, oath, ether; though, bathe, either."

The sounds of "r" and "l" may be tested by the words "run, arrow, law, ell, fellow."

If the velum does not rise during the vowels, they have a nasal character reminding one of the

FIG. 86. — Recording the nasal current and vibrations.
A small glass tip is inserted into one of the nostrils. Currents of air and vibrations from the nose pass down the rubber tube to the small recording tambour, whose lever traces a line on the recording surface.

French nasal vowels. If it does not rise during "s," that sound appears like a nasal snort. For the occlusives (p, b, t, d, k, g) the lips or the tongue close the air passage in front and the velum closes the nasal passage; the air, which accumulates under some

pressure, is released by the lips or the tongue; this causes a slight puff or explosion from the mouth. If the velum is dropped before the release, the explosion

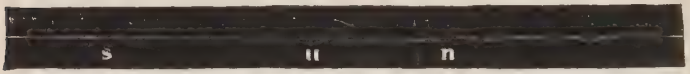


Fig. 87. — Nasal record of "sun" spoken normally.

occurs through the nose, producing peculiar snorting sounds for "p," "b," "t," "d," "k," and "g."

Graphic records may be obtained by the arrangement shown in Fig. 86. For example, the nasal rec-

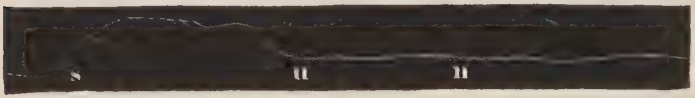


Fig. 88. — Nasal record of "sun" with relaxed velum.

ord of "sun" with correct "s" (Fig. 87) shows no emission of air during "s," that with nasalized "s" (Fig. 88) shows a strong snort. The snorting "s" is what has been described as "nasal sigmatism"; the other snorting sounds have not been specially named.

Sometimes it is sufficient to explain these principles to the patient and let him feel the improper nasal breathing on the back of his hand. A tissue paper flag (Fig. 89) or a light piece of cotton is also effective.

It is often very effective to use a breath indicator which shows when air issues from the nose (Fig. 43).

The patient must learn to make all the vowels and the proper consonants without letting air escape

FIG. 89. — Tissue paper indicator.
The passage of breath through the nose or the mouth moves the piece of paper.

from the nose. This he must do in continuous speech also.

The muscles that press the velum against the rear of the pharynx can be strengthened by a velar hook (Fig. 90) made of a rubber penholder whose end is softened in hot water and bent, or of a bent laryngeal electrode. The hook is inserted behind the velum

and the vowels are spoken or sung while the hand pulls on the handle of the hook (Fig. 91).

Very effective is the application of a laryngeal electrode with a very mild faradic current to the

Fig. 90. — Velar hook.

velum. The slight shock induces the person to draw the velum up.

An appeal to the ear may be made by using the nasal tip and rubber tube shown in Fig. 86 with the free end placed to the ear. When the velum is properly raised during "a," "s," "papa," etc., very little is heard in the ear. When the velum is not raised, the sound through the tube is very loud. The tube

is placed to the patient's ear and the instructor puts the tip to his nose, while he pronounces the words.

FIG. 91. — Velar hook in position.
The hook has been placed behind the velum, which is raised against a slight resistance from the hand.

Then the tip is transferred to the patient's nose so that he can listen to himself.

Larynx Defects

The use of surd "s" (as in "sun") for the sonant "s" (as in "does" or "zone") sometimes occurs. Such a patient pronounces "lies" and "doze" as if they were "lice" and "dose." He is taught the

difference between surd and sonant; he puts his finger over the larynx (Adam's apple) and feels it

Fig. 92. — Mouth record of "dog."

The record was taken with the apparatus shown in Fig. 7. The straight line at the beginning represents the stoppage of breath during "d." The following vibrations are those of the vowel. The faint vibrations where the line begins to sink are those during the occlusion of "g." Strong vibrations appear at the end, that is, during the explosion of "g."

vibrate while he sings or speaks a prolonged vowel with a "z" (as in "does" or "zone").

Fig. 93. — Mouth record of "dok."

The record differs from that in Fig. 92 in having no vibrations during the sound after the vowel, namely, during "k."

Similar confusion may occur with the other sounds; "t" may be used for "d," "k" for "g," etc., and likewise the reverse.

The most common trouble is that the larynx stops vibrating before the sonant is really finished. Thus, the person appears to say "dok" instead of "dog"; in reality the last sound was half "g" and half "k,"

and he said "dogk." Mouth records of the three cases are given in Figs. 92, 93, 94. The trouble can usually be corrected by training the ear.

General Indistinctness

The negligence may go so far that the patient speaks in a generally slurred manner. Ordinarily

FIG. 94. — Mouth record of "dogk."
There are faint vibrations after the vowel, showing that the sound began as "g" and not as "k"; these die away and none are found at the time of the explosion, showing that the sound ended in "k."

this is corrected by having him repeat sounds, words, and sentences after a careful speaker. The following points are to be especially noticed.

The sounds "p, b, t, d, k, g" are produced with the lips or tongue stopping the air passage. When the stoppage is released, the air comes out with a slight puff or explosion. When the air pressure is allowed to fall before release of the lips or the tongue no explosion occurs. This is the normal pronunciation in French; in English it indicates negligence.

A graphic record (Fig. 7) of the normal "p" (Fig. 95) shows the sharp explosion at the end of the occlusion.

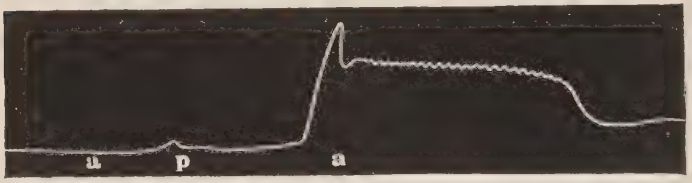


Fig. 95. — Mouth record of "apa" with the explosion of "p" well marked.

The record was taken with the apparatus shown in Fig. 7. The waves at the beginning are those of the first vowel. Then follows the straight line for the occlusion of "p." The sharp upward movement of the line is the result of the explosion of "p." Thereafter follow the vowel waves.

A record where the explosion is omitted is shown in Fig. 96.

The cure consists in training the patient to explode his "p"s, "t"s, etc., so that the explosion is

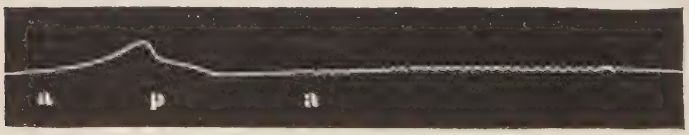


Fig. 96. — Mouth record of "apa" with no explosion of "p."

The record is the same as in Fig. 95 without the sharp upward movement of the line. The "p" had no explosion.

quite audible. The breath indicators shown in Figs. 42, 43 with a mouthpiece are most effective. The patient must learn to make all his occlusives with marked explosions.

The "s" and other sounds are often made too weakly. The patient must learn to hiss the "s" strongly and to make each sound with sufficient energy to cause it to be heard distinctly. Sometimes the nasal sound "n" is systematically too weak. It is corrected by speaking and reading with prolonged "n"s.

Vowels or consonants are often slurred over too briefly. The training consists in reading and speaking with the vowels exaggerated in length.

For general indistinctness it is useful to speak and spell words backward over a private telephone wire or to a person so far away that there is difficulty in understanding. The patient may practice repeating words from a dictionary, making, for example, at one time all the "s"s prominent, at another all the "t"s, etc.; such combinations as "tw," "tr," "str," etc., require special attention. Such sentences as "Peter Piper picked a peck of pickled peppers," "Round the rough and rugged rock the ragged rascal ran," "Shall she sell sea shells by the seashore," "Tired Tommy tripped his toes," etc., are useful.

The higher degrees of indistinctness found where

the intellectual development begins to be slightly defective are to be treated by the following system:

Tongue gymnastics are introduced. They include, (1) putting out and pulling in tongue; (2) moving it from side to side; (3) holding it out while 2, 3, etc., are counted; (4) turning up the tip of the tongue to the palate (with fingers if necessary). Similar exercises are performed in advancing the lips, biting them, pouting, grinning, and moving the lower jaw.

Respiration exercises may include blowing up bags, blowing out candles, blowing bubbles, etc.

The articulation exercises are to be based on the principle that the child is to see how the teacher makes each sound; he hears the sound and is then to feel his own movements and see them in a mirror while he hears himself make the same sound. Thus, after seeing the action of the teacher's lips for "f" and "v" he watches his own lips in a mirror. To distinguish between "f" and "v" he puts his hand over the teacher's larynx and feels that the vibrations are lacking in "f" and present in "v"; then he feels his own larynx. The lip and tongue positions for the other consonants are taught similarly. The

emission of the breath during "h" and the fricatives may be felt by the hand held in front of the mouth.

Careful drill in pronouncing words and sentences can be carried out in connection with reading exercises.

The training of the intellect should be carried on at the same time. As speech is most closely connected with thinking, the most efficacious method is to make the speech training the center of the entire instruction.

CHAPTER III

ORGANIC LISPING

"ORGANIC lisping" is the term that may be applied to such speech defects as arise from anatomical defects of the vocal organs.

The defective speech is usually a great drawback to the patient's career. It sometimes leads to further troubles. One boy whose enunciation of "s" and "z" was defective on account of overshot jaw had his ideas of speech so confused that he had failed to correct the infantile "t" for "k" ("tandy" for "candy"), although he could make such sounds perfectly. Moreover, the defect had caused him so much mental distress and strain that he enunciated his sounds with strongly contracted muscles, whereby they were indistinct. He thus had all three kinds of lisping: organic, negligent, and neurotic (Chapter IV).

Lisping from Hare Lip or from Feeble Lips

The former requires the surgeon. The latter may, in some cases, be aided by massage, electricity, and lip

gymnastics. The lip gymnastics include specially pressing them tightly together, holding them tightly while the breath is pressed against them, pouting, puckering, etc. If the lips are weak on account of muscular dystrophy, all such treatment must be avoided.

Fig. 97. — Hemiatrophy of the tongue.

Degeneration of the nerve centers had caused one side of the tongue to become much smaller and weaker. This caused the patient to lisp. The lisping had produced such a condition of embarrassment and fear that she was considered backward, although really perfectly normal mentally.

Lisping from Tongue Defects

When the tongue is too thick, too small, too clumsy, or injured, the resulting inaccuracies may be mitigated by careful gymnastics (p. 160) and training by means of mirror, palatograms (p. 114), etc.

Hemiatrophy of the tongue (Fig. 97) shows itself in smallness of one side of the tongue, in grooves in the surface and in fibrillary twitchings. The speech is usually correct, but not always so. The speech of

one girl of fifteen was so indistinct that she could not get along in school and was considered mentally dull. The correction and scolding at school and by the mother had produced intense depression. The cause was a hitherto unobserved hemiatrophy of the tongue which made it difficult to use the tongue properly (organic lisping); this had so confused her that she made all sounds indistinctly (negligent lisping).

A stuttering boy of eight years was found to have imperfect enunciation, due to confused habits of enunciation arising from weakness of one side of the tongue. The physical defect had thus produced organic lisping, which had in turn produced negligent lisping. The embarrassment and shame had produced not only severe stuttering, but also a serious deformity of character.

Lisping from Tongue-Tie

When the frenum of the tongue is too short, it prevents the tongue from rising sufficiently in front to cut off all the air except what passes through a small channel to make the "s" sound (Fig. 56). The sound actually produced is more like "th";

e.g. "people thay I lithp, but I don't pertheive it." If the person can project the tip of the tongue beyond the teeth, the tongue is free enough for correct speech.

To cut the frenum the region is thoroughly cocainized; an incision is made with aseptic scissors; the membranes are then torn slightly further by the fingers wrapped in gauze. A too deep incision risks cutting large blood vessels.

In older people the lisp may still remain as a habit. It should then be treated as in the case of "t" for "s" (p. 130).

There is an antiquated belief that tongue-tie causes stuttering. It cannot do so directly, but I have had cases where the lisping due to tongue-tie had made the person so nervous that he had become a stutterer (p. 43).

Lisping from Jaw and Tooth Defects

Overshot and undershot jaws are due mainly to irregular development of the teeth. The undershot jaw occurs also with the disease akromegaly. In excessive cases of overshot or undershot jaw the projection may be so great that the lips do not close

properly for "f," "v," "p," "b," "m," and several of the vowels. In these and similar cases it is frequently difficult to adjust the tongue quite correctly, especially for "s." With strongly undershot jaw the "s" sound may be produced as the tongue moves to its position to make a "t"; "tool" sounds like "stool." When the upper front teeth project much beyond the lower ones it is frequently difficult to adjust the tongue so that the jet of air strikes the lower teeth correctly for "s" (Fig. 56); the sound is rather like "sh." The procedure is like that for the similar cases in negligent speech.

The gaps left by extracted teeth often affect the "s" in ways difficult to remedy except by inserting artificial teeth.

Sometimes a canine tooth is bent inward in such a way as to hinder the tongue in making "t"; a slight "s" sound precedes the "t."

For many jaw and tooth defects the most important therapeutic procedure is orthodontism. If the child is under sixteen years old, he should be put in the care of an orthodontist. Older cases are usually hopeless.

Lisping from High Palatal Arch

The defect mainly affects the "s"; the person has difficulty in getting the tongue properly against the palate to produce the small channel. Sometimes he lets the air escape at the sides. Sometimes the attempt to press the tongue up tightly leads to a strong spasmodic pressure at every "s." One such patient with the "s" spasm was often supposed to be a person who stuttered only on "s." In one case the patient, eleven years old, had given up all effort at using the tongue for "s," replacing it by a pause filled by a cramp in the larynx. He pronounced "sink" apparently like "ink"; in reality the pronunciation was ('ink), where (') indicates the glottal catch. The distortion of speech caused by the omission of the "s" had produced so much trouble that the boy had acquired the strained, hoarse voice and the sad face of a stutterer. The defect can be cured or alleviated by careful attempts to get the proper position. The spasmodic cases are helped by training in soft and relaxed speaking. With the patient just mentioned who always omitted the "s," the cure consisted in teaching him to use "ts" for "s,"

whereby he would say "tsoup" for "soup." As soon as the habit was formed, he dropped the "t" and retained the "s."

Lisping from Cleft Palate

When the velum cannot close the rear passage through the nose, all the sounds except nasals are modified. All the explosives become nasal sounds, thus "p" and "b" become "m," "d" becomes "n," "g" becomes "ng," "t" and "k" become surd "n" and "ng," "s" becomes a snort, etc. The vowels are all nasal.

After the velum has been closed by operation, there may be little or no ability to raise it into place across the pharynx. Its muscles can be strengthened by the velar hook (p. 154). Exercises can be devised for teaching the use of the velum, such as blowing out a candle, playing a mouth harmonica, etc. The patient does them at first while holding his nose closed with his fingers; he gradually lessens the finger pressure and tries to substitute velar action.

With a light illuminating the interior of the mouth, the patient observes his velum in a mirror as he sings "ah" on a low note and then on a high note. The

velum should rise for both notes, more for the higher ones. Exercises with a nasal indicator, tissue paper flag, etc., as described for negligent speech (p. 153), aid in giving the proper control. Electrical stimulation (p. 154) is often very effective.

To make the velum rise during the occlusives "p, b, t, d, k, g" they are pronounced singly and in words with much prolonged occlusions and sharp explosions at the end. This cannot be done unless the velum is properly raised.

Occasionally some of the velar associations are very firmly fixed; special devices must be tried to break them up. Thus, if the velum persists in remaining down for "s," rods of various sizes may be placed over the tongue (p. 143, Fig. 76).

The loss of air during speech with a cleft palate naturally leads the patient to take breath repeatedly within a sentence. The habit may persist after the operation; in such a case systematic breath exercises are to be performed.

The great effort involved in speaking with a cleft palate may lead the patient to overexertion of all his speech muscles; this produces a grimacing speech; that is, the muscles of the face overact. This is

liable to persist after operation. Relaxation is taught by speaking with no lip motion (as in ventriloquism), by singing, by exercises in melodious speech (p. 74), etc. The nervous rapidity of speech requires exercise in slowness (p. 85).

Lisping from Relaxed Palate after Adenoids

When a person has large bunches of adenoids, the closure of the velum is made against them. After they have been removed, the velum sometimes makes the same amount of movement as before. This leaves a gap between it and the rear wall of the pharynx whereby all sounds become nasal. The treatment is the same as for negligent lisping (p. 150).

Lisping from Obstructed Nasal Passages

The obstruction deprives the nasal sounds more or less of their peculiar ring. Thus "m" sounds like "b," "n" like "d," etc.

This condition is found temporarily in severe colds; the turbinates in the nostrils become swollen and the nasal cavities are more or less closed. Permanently enlarged turbinates or a deflected septum may cause a similar result. With large adenoids the

passage through the upper pharynx is also more or less obstructed.

In regard to speech this condition is the opposite of that with cleft palate. The nasalization from cleft palate, etc., consists in adding nasal tones to sounds where they do not belong. The denasalization from obstruction consists in eliminating nasal tones when they should be present.

No special voice treatment can improve this condition. For colds the treatment comprises a laxative (Seidlitz powder, citrate of magnesia), cleansing with antiseptic sprays, menthol, coryza wool, etc. Turbinates, adenoids, and tonsils are referred to specialists.

Lisping from Defective Hearing

When the hearing is diminished, the child may fail to grasp the finer essentials of the sounds. In mild cases the words may be spoken loudly into his ear. Each incorrect sound may also be treated separately as described in the chapter on Negligent Lisping. Hearing tubes are often useful.

In more severe cases lip reading should be taught in a way somewhat similar to that for deaf children. By feeling the teacher's larynx and his own larynx

and by listening to loud tones from a musical instrument the child gets a definite idea of pitch and of the adjustment he must make in his larynx in order to produce musical sounds. Then by watching the instructor's face and by looking in the mirror he learns the positions of the lips for the individual sounds. In a similar way he learns the positions of the tongue for "t," "d," "k," "g," etc. The positions are explained by the diagrams in the plates at the end of this book. The tongue positions for the vowels and consonants can be taught in this way.

To show the various amounts of breath that issue during the vowels, during "h," during the fricatives, and for the explosions in the occlusives, the patient's hand is put before the instructor's mouth and then before his own. A slate, a cold piece of metal, or the breath indicators described on pages 119–121 can be used for the same purpose. The presence or the absence of nasality can be shown in a sim lar way. As much as possible the child should be made to hear all the sounds. When such children are spoken to, they should be able to see the face of the instructor.

CHAPTER IV

NEUROTIC LISPING

Patients with this trouble often enunciate sounds in ways that resemble negligent speech. The failure of the methods of treatment for negligent speech first made it clear to me that this disorder was of an entirely different nature.

One patient used "t" for "s," "d" for "z," and "t" and "d" for the two forms of "th," the tongue action being the same as that described on pp. 130, 141. The patient also said "tsoe" instead of "shoe." The occlusives (t, d, k, g) were used correctly, but they had no explosions (p. 157). This was quite in contrast to the false occlusives "t" and "d" used for "s," "z," "th," as these had strong explosions.

The patient had learned to talk clearly, but at four years of age she fell, striking her head; she remained unconscious for several hours.

A few days afterwards she had convulsions; they were frequently repeated till the age of six. The

defect in speech appeared shortly after the fall. She now has a tremor of the entire body when she attempts to speak. There is also a tremor of the lips during "p" and "b" and a tremor of the laryngeal tone when a vowel is sung. It is hard to get her to produce any loud or long sound; every sound, even a simple hiss, is produced in a manner indicative of excessive timidity and almost of fright. These conditions never occur in cases of negligent lisping; the patients are always perfectly cool and deliberate; they are sluggish and phlegmatic instead of nervous. The similarity of her mental condition to that of the stutterer is evident.

Graphic records were made of the air current for the mouth while she pronounced some sounds. The arrangement was that shown in Fig. 7. When a current of air issues from the mouth, the recording lever rises and the white line bends upward. A descent of the line indicates that the air current is diminished or cut off. The decrease of the air current may be due to some adjustment of the tongue or lips or to a cessation of the pressure from the chest.

The record for "so" in Fig. 98, spoken by a normal person, shows that the air current steadily

increased during the first part of the "s" and then fell somewhat. The small waves in the record are due to the laryngeal vibrations; in "so" they indi-

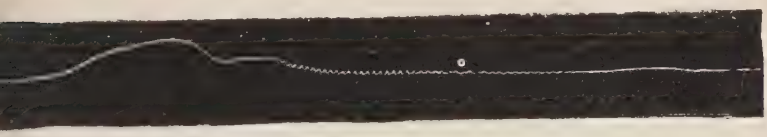


Fig. 98. — Mouth record of "so" spoken normally.
The first part of the line registers the emission of the air during the "s"; it rises and falls smoothly. The small vibrations indicate the waves of the vowel.

cate the vowel. A record of "so" spoken by the patient is given in Fig. 99. Instead of the gradually increasing and diminishing air current for "s," the

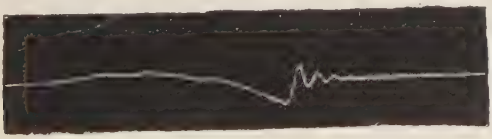


Fig. 99. — Mouth record of "so" in neurotic lisping.
There is very little emission of the air for the "s"; it is suddenly cut short by complete stoppage. The sudden descent of the line at the beginning indicates that the tongue was drawn sharply back. The larger waves after the step show the explosion as the "t"-like sound is completed by the release of the tongue. The small vibrations are those of the vowel.

patient merely starts the current, and then not only cuts it off, but actually causes the line to fall below zero.

For the normal "s" the tongue is placed against the roof of the mouth in such a way as to leave a

small channel in the middle, through which a jet of air is directed against the lower teeth. A palatogram for normal "s" is shown in Fig. 54; a mouth diagram of the position of the tongue is shown in Fig. 56. During the normal "s" a current of air passes to the recording apparatus and causes the line to rise steadily.

The record in Fig. 99 indicates that the patient pressed the tongue so hard against the top of the mouth that she closed up the small channel; moreover, in doing this she made such a forcible movement of the tongue that air was actually drawn into the mouth for an instant. The sudden rise of the line indicates that, as the tongue was released from its place, the air burst from behind it in the form of a sharp puff, or explosion, that acted like a blow on the recording membrane. The sound produced by such action is like that of "t." Apparently the patient substituted "t" for "s." In like manner for "z" she used a sound like "d."

The mechanism for the defective "s" is like that for occluded "s" (p. 130), as indicated by the palatogram in Fig. 55 and the mouth diagram in Fig. 57. The tongue is pressed against the palate harder

than it should be; the small channel is thereby closed.

The graphic record of "silk" (Fig. 100) in normal speech shows a rather long emission of air for "s,"

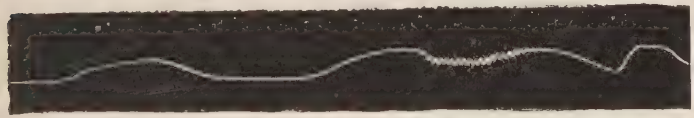


Fig. 100. — Mouth record of "silk" spoken normally.

The "s" and the vowel are indicated as in Fig. 98. The "l" is represented by some small vibrations at the end of the vowel. The "k" begins as a fall in the line due to cutting off the breath by the tongue; it ends in a strong upward movement due to the explosion as the tongue is released.

followed by waves for the vowel and "l." The "k" begins as the vowel waves cease; the line falls be-

Fig. 101. — Mouth record of "silk" in neurotic lisping.

There is first a brief intake of breath, then an emission of breath corresponding to a normal "s." This is followed by an occlusion with an explosion. The sound is thus partly a normal "s," as in Fig. 98, but mainly an occlusion with an irregular explosion. The following fine vibrations belong to the vowel and "l." The "k" is represented by a straight line due to the stoppage of the breath by the tongue; the abnormality is shown by the lack of an explosion wave for the "k," the breath being stopped before the tongue is released.

cause the current of air is cut off by the tongue; the explosion of the "k" is marked by the sudden rise of the line at the close.

The record of "silk" (Fig. 101) by the patient shows a sharp inrush of air followed by a sudden rise of the line with some emission of air thereafter. The inrush of air indicates presumably an extremely brief gasp as she starts the tongue movement. The sudden rise shows that the sound "s" is begun. This sound is at first a true though faint "s," some air being emitted. There follows, however, a sudden

Fig. 102. — Mouth record of "shoe" in normal speech.
The emission of air during the "sh" is similar to that of "s" in Fig. 98. The record ends with the vowel vibrations.

drop of the line; this shows that the breath has been stopped and that the sound has become an occlusive. The sudden rise of the line thereafter shows that this sound, like most occlusives in English, ended with an explosion. The first part of the sound was thus a true "s," while the second was an occlusive "s" with an explosion. The remainder of the record shows the waves for the vowel and "l" followed by a straight line for the occlusive "k." The "k" is abnormal, having no explosion.

The record of "shoe" in Fig. 102 is that for normal

speech. It shows an emission of breath during "sh" similar to that for "s" in Fig. 98. The action of the tongue for "sh" is like that for "s" in forming a channel through which the air is directed. A palatogram for normal "sh" is given in Fig. 69; a mouth diagram in Fig. 70.

A record of neurotically lisped "shoe" is given

Fig. 103. — Mouth record of "shoe" in neurotic lisping.

The straight line, the sudden fall, and the strong waves show that the tongue closed the mouth, was sharply drawn back, and was then released with a strong explosion. Then followed a faint breathy sound like a weak "s." The record ends with the vowel vibrations. To the ear the word sounded somewhat like "tsoe."

in Fig. 103. There is a sudden intake of breath; this is abruptly released. This indicates that at the start the tongue was placed tightly against the palate. As it was released to form "sh," it permitted a slight puff of air to pass. This would produce a short "t." The "t" was followed by a rather faint emission throughout the "sh." There was no occlusion during or after the emission; otherwise the line would have descended at some point as in the "s" of Fig. 99. That the passage was not wide open, however, is

shown by the slight elevation of the line during the emission of the breath and by the sudden rise (slight explosion) in the line at the end of the "sh" just before the vowel begins. The sound is not so open as in the normal "sh." The impression on the ear was that of "tsoe" rather than "shoe."

For the two forms of "th" as in "thick" and "this," she used sounds resembling "t" and "d." For "th" the tongue is pressed against the palate at the sides, but the contact in front is so light that the air escapes (Fig. 71). The patient pressed the tongue too tightly and cut off the air entirely.

The condition for "k" noted in Fig. 101 is typical for all her occlusives, *i.e.* sounds involving a complete closure of the mouth passage; namely, "p," "b," "t," "d," "k," hard "g." In these she regularly weakens the breath pressure before they end, so that they have no explosions when the tongue or the lips release the tension. This is quite in contrast to the incorrect occlusives that she makes out of the fricatives "s" and "sh," etc., to which she gives strong explosions.

The case seems at the first view to be one of what has been termed "negligent lisping" (p. 122). Children

with this trouble regularly substitute "t" for "s," "d" for "z," and "t" and "d" for the two forms of "th," just as this person does. The defect arises from the same cause, namely, pressing the tongue too tightly against the palate.

The excessive tongue action in negligent lispers arises from negligent observation and careless action. The children with negligent speech are usually those that have grown up in surroundings unfavorable to careful enunciation, as among the poorer classes or where baby talk has been encouraged. This patient, however, had learned to talk clearly. Moreover, she is not careless about her speech, but overanxious. Her tongue touches her palate not simply because she is too negligent to take the pains to leave a small opening, but because it is seized by an uncontrollable spasm.

It is evident that we have here a form of speech characterized by quick nervous muscular action instead of the deliberate smooth action required for normal sounds. In trying to make the "s," for example, the patient is too nervous to carry out the fine adjustment requisite; she presses the tongue too tightly and thus makes a "t." The result for the

hearer is the same as in negligent lisping, but the nervous processes in the two diseases are quite different.

Can this be a form of stuttering where the excessive contractions are quite limited? A never-failing symptom in stuttering is the excessive contraction of the laryngeal muscles whereby the laryngeal tone becomes hard and monotonous; here the laryngeal tone is rather soft and timid. Moreover, the stuttering cramps are never confined exclusively and constantly to just a few sounds. They frequently vary from time to time, the trouble being on "p," for example, during one month and on "s" during another month. Again, the stutterer will have trouble not on a single consonant wherever it occurs, but on consonants in a certain position, generally initial ones. Facial and bodily contortions often occur with stuttering, but I have never found tremor present. We must conclude, I think, that this is not a case in any way resembling stuttering, although the cause may be the same.

Another case was that of a girl of thirteen who lisped over all the consonants. Her speech was at times almost unintelligible. Treatment along the lines

of muscular and mental education indicated for negligent lisping produced no result. She was an excessively nervous child, and she spoke with incredible rapidity. As she was gradually quieted down, the lisping decreased. It became evident that the excessive nervous tension, combined with self-consciousness, produced a tense condition of the vocal organs allied to that of stuttering. She could not produce the smooth and delicately adjusted movements of normal speech because her muscles were overtense.

Another case of nervous lisping was that of a girl of twelve whose speech was mumbled. Her mother thought her tongue was too long; her father thought there was something the matter with her intelligence. The methods for curing negligent lisping were fruitless. It became evident that partial deafness had made it hard for her to learn to speak. Being a sensitive child, the constant correction by the parents and the embarrassment and fear before them had produced a condition of nervousness much as in the previous case. She spoke improperly because she overinnervated the speech muscles. She began to improve under

quieting treatment. Unfortunately the parents did not trust the diagnosis, and preferred to regard the defect as one of intellect.

Neurotic lisping is rather frequently found combined with stuttering. A patient twenty-eight years old was a typical stutterer. At the same time his speech was, aside from his stuttering, so indistinct that he was frequently asked to repeat a word. For example, he would say that he had been to Hartford in such a way as to leave it in doubt if he had said "Harwood," "Harvard," "Havre," or something similar. The "s"s and "n"s were weak and often inaudible. The explosions of the occlusives "p," "b," "t," "d," "k," "g" were generally omitted. The "r" sounded sometimes like "u" and sometimes like "l." The words were often contracted to unintelligible mumblings. Treatment by the methods used for negligent lisping made the trouble worse. The treatment for his stuttering included methods that caused the patient to relax his vocal muscles. It was noticed that during such relaxation the consonants were often spoken correctly. It was thus evident that the lisping was due to excessive general innervation, that is, that it was neurotic lisping.

For differential diagnosis we may sum up as follows: Neurotic lisping is allied to stuttering in its causation (fright, nervous strain) and in the presence of an emotional disturbance. It differs in having excessive muscular tension of a constant rather than a spasmodic kind; this results in speech somewhat like lisping and not in the peculiar sounds of the stutterer. It differs from negligent lisping in the fact that it appears in nervous persons and not in phlegmatic or dull ones, and that the muscular movements are cramplike instead of careless.

The general treatment is mainly that for neurasthenia. General hygiene, mode of life (school, profession), moral habits, eyestrain, nose and throat conditions, etc., must be considered. Arsenic, quinine, strychnine, and other tonics, cold rubs, lukewarm or cold half baths, sprays, moist packs, electrotherapy, massage, change of climate, and sea baths may be tried. Open-air exercise is always admirable. Hypnotism and other forms of psychotherapy are often most efficient.

The special speech treatment consists in explaining the trouble to the patient and then having him repeat sentences, answer questions, and talk

in a relaxed way. The relaxation may be brought about voluntarily or by suggestion. An efficacious method of suggesting relaxation is to have the patient recline on a couch and gradually fall into a semi-doze while repeating sentences or conversing.

CHAPTER V

CLUTTERING

CLUTTERING is characterized by great nervousness that shows itself in excessive rapidity of speech with indistinct enunciation. When the patient starts to speak, he hastens recklessly through what he has to say. The nervous hurry of his mind makes him form and combine the sounds imperfectly. Sounds, syllables, and words are mumbled together. The breathing may become spasmodic and irregular. A normal person can speak as rapidly as a clutterer without necessarily losing the distinctness in enunciation; it is the clutterer's nervousness that produces the defect.

Cluttering is usually combined with stuttering, but it can be distinguished from it. In the one there is nervous haste; in the other there is nervous fear. The clutterer speaks better the more he thinks about his speech, the stutterer often speaks better the less he thinks about it. The clutterer shows negligence and

lack of self-control; the stutterer cannot release himself from anxiously watching over his speech. My experience has included only a few cases of cluttering without stuttering. Quite a few stutterers are also clutterers.

Cluttering sometimes produces stuttering. The cluttering child is ridiculed or made anxious in other ways until the "stutterer's fear" is produced. One unusually bright but excessively nervous and self-willed boy of six had developed a language of his own, which he spoke at excessive speed. This speech was intelligible only to his younger brother, who had learned to speak in the same way. His notions of spelling were likewise completely confused. The troublesome situations that had resulted from the cluttering had embarrassed the boy and made him anxiously nervous, with the result that he both cluttered and stuttered.

Negligent lisping, when it includes many sounds, resembles cluttering in the general indistinctness of speech, but the two disorders can be distinguished by the fact that in cluttering the speech is quick and hasty, whereas in negligent lisping it is of normal or slow speed. With very slow speech the cluttering

sometimes disappears, the negligent lisping remains. All sorts of sounds are affected in many cases of cluttering; in negligent lisping a definite set is affected. It is my experience that some clutterers make a set of defective sounds, such as "s" or "sh," incorrectly even when they speak slowly. It is not correct to say such cases have negligent lisping also, because the cause — namely, the mental attitude — is utterly different in the two cases.

The therapy consists of tongue gymnastics, of exercises in enunciating words singly and in combination, and in speaking slowly and distinctly. If the clutterer is forced to enunciate certain sounds, such as the explosives (p. 117) or "s" very distinctly, he is obliged to speak slowly, and can thus learn to enunciate all sounds better. The breath indicator (p. 119) can be used. In severe cases the treatment may begin with singing. The nervousness may be combated by proper hygiene, tonics, rest cures, hypnotics, or psychanalysis.

PART III

EXERCISES

SET I

BREATHING (p. 84)

1. *Active Calisthenics*

A. Standing, breathing while raising arms fore upward and side downward.

B. Same, raising arms side upward and downward.

C. Broad standing (that is, with feet separated), neck firm (that is, finger tips touching back of neck, elbows out), sideward bending alternately right and left (breathe in on upward movement).

D. Broad standing, neck firm, turn trunk to right and then to left as far as possible, inspire on returning to position.

E. Broad standing, hands on hips, turn to right as far as possible, then forward and backward, inspire on returning to position; continue turning to left.

F. Broad standing, arms raised upward, bend forward, rise up.

(In all these exercises inspiration through the nose should occur as the ribs are expanded, expiration through the nose as they are moved inwards. Each movement is to be performed five times or more.)

2. *Regulation of Breathing*

A. Standing, place one hand on the chest and the other on the abdomen; take a long breath, enlarging the chest in all directions, and drawing the abdomen in. Expire by letting the chest fall and the abdomen spring out. Repeat this, always trying to enlarge the chest still more, and trying to blow out a stronger breath on expiration.

B. Same on inspiration, but not using the hands. On expiration, let the breath pass out slowly. Repeat this, trying to make the breath last longer and longer.

C. Same, except that a powerful "ah" is sung.

D. Same inspiration, sing "ah" as long as possible, crescendo-diminuendo.

(Breathing is to be done with open mouth. Each movement is to be performed five times or more.)

3. *Breathing and Use of Twist* (p. 78)

A. Raise the arms side upward, inhaling, lower side downward, singing "ah" on middle *c*.

B. Raise the arms side upward, inhaling; lower side downward, singing "ah" sliding from middle *c* to high *c* (octave twist).

C. Likewise, speaking words of one syllable with the octave twist.

D. Likewise speaking words of two syllables with the octave twist on the first vowel.

(Each step is to be done a number of times.)

4. *Regulation of Breath in Singing*

A. Sing a short song with inspiration before each line.

B. Sing two lines with one breath.

C. Sing three lines with one breath.

D. Sing four lines with one breath.

5. *Regulation of Breath in Reading*

Take a full breath before each sentence or phrase; wait one second, not letting any breath out. Then speak the sentence or phrase slowly in one breath; do not breathe in the middle. Use a text with short sentences, poems, and longer prose pieces.

6. *Regulation of Breath in Speaking*

Holding a stick in the hand, raise it each time before speaking, while breath is inspired vigorously. After waiting one second with bated breath, speak as instructed.

A. Read a short sentence after the instructor.

B. Answer the question of the instructor.

C. Make a sentence concerning some topic assigned by the instructor.

D. Give a description of some object pointed out by the instructor, breathing vigorously before each sentence.

(The first two parts of this exercise can be conveniently combined into the "statement and question exercise." The instructor gives a series of statements and questions. Each statement is to be repeated, and each question is to be answered. The confidence gained by the pupil in repeating the statement helps him in answering the questions. A book on "travel talk" supplies convenient material. See also p. 92.)

SET II

MELODY (p. 74)

7. *Giving the Idea of Melody*

A. Sing a short song in the key appropriate for the pupil's voice with inspiration before each line.

B. Speak the words of this song on the same notes, the piano being played at the same time.

C. Same as *B* without the piano.

D. Speak the words melodiously, that is, with a rise and a fall of the voice, but not necessarily on the same notes as the song.

E. Speak the words of the song melodiously, but with perfect freedom.

8. *Introducing Melody into Speech* (p. 91)

A. Sing a short song, speaking the last word of each line instead of singing it.

B. Repeat, speaking the last two words.

C. Repeat, speaking the last three words.

D. Continue in the same way, adding word by word until the whole song can be spoken perfectly.

E. Sing some statement, for example, "New York is a very large city." Repeat it, speaking the last

word. Then repeat it, speaking the last two words. Continue as before.

F. Question and answer. The instructor gives the question, the patient gives the answer. First sing them, then speak the last word, then last two words, etc.

9. *Introducing Melody into Recitation*

A. Recite:

"Oh, look at the moon! She is shining up there.
Oh, mother, she looks like a lamp in the air.
Last week she was smaller, just like a bow;
This week she is larger and round as an O."

The voice is to rise and fall somewhat in the following way:

moon shining
look
the is there.
Oh, at she up

B. Recite other pieces of verse and prose likewise.

10. *Introducing Melody into Conversation*

A. A question is sung on some simple melody or on the notes *c*, *e*, *g*, *c'*, or as a chant on one or two notes. The answer is sung likewise. It is of no account

whether the syllables exactly fit the notes or not. This is repeated until there is no difficulty; each of the following steps is also to be repeated until at least fair success is obtained.

B. Statements are alternated between two persons in the same musical way. At first the statements may be disconnected; "Rice grows in the Southern states"; "New York is the largest city in America." Gradually they are to be turned into a connected conversation.

C. Same as *A*, but speak the words with piano accompaniment.

D. Same as *B*, but with words spoken to accompaniment.

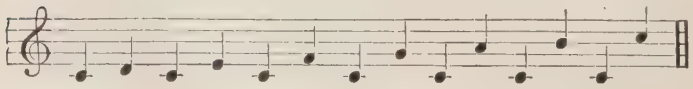
E. Question and answer without the piano, but with attempt at the melody used before.

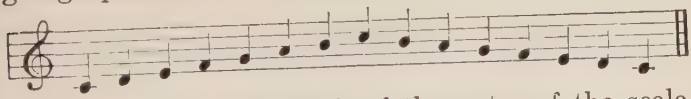
F. Statements likewise.

G. Question and answer melodiously, but freely.

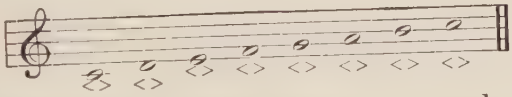
H. Statements likewise.

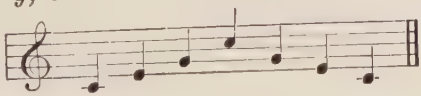
11. *Training the Ear to Control the Voice*

A. Sing "ma" on each of the notes as indicated.

B. Sing "ma" on each of the notes of the scale going upward and downward.



C. Sing "ma" on each of the notes of the scale, beginning and ending it very faintly, and making it long.



D. Sing "ma" upward and downward on the notes *c*, *e*, *g*, *c'*.

SET III

FLEXIBILITY (p. 74)

12. *Singing*

A. Sing the vowel "ah," through the notes of the octave.

B. Strike the lowest note of the octave, then the highest; sing the vowel "ah," half on the lowest note, half on the highest.

C. Sing the vowel continuously (*portamento*) over the octave (octave twist).

D. Practice singing the different vowels over the octave in this way.

E. Sing a series of one-syllable words with long vowels, running the vowels up in the same way.

13. *Speaking*

A. The instructor speaks a word with the octave twist. The pupil repeats it.

B. Same with sentences, putting the octave twist on the first important vowel (the first important vowel is not necessarily the first vowel).

C. Same with poems, putting the octave twist on the first important vowel in each line.

D. Same with prose, putting the octave twist on the first important vowel in each phrase.

E. Statement and question exercise (see note to Exercise 6) with the octave twist.

SET IV

SLOWNESS (p. 85)

(It is advisable to give the "octave twist" to the first important vowel in each sentence, as under Flexibility, Exercise 13, B.)

14. *Speaking with Lengthened Vowels*

A. Repeat, after the instructor, single monosyllables, making the vowel three times as long as normally.

B. Repeat words of more than one syllable, lengthening the chief vowel likewise.

C. Repeat short sentences likewise.

D. Read words from a book likewise.

E. Read poems likewise.

F. Read prose likewise.

G. Answer questions likewise.

H. Tell a short story likewise.

15. *Speaking Together* (pp. 62, 94)

A. Repeat or read a poem in unison with another person speaking slowly.

B. Repeat or read it alone slowly.

C. Repeat or read a prose piece with another person slowly.

D. Repeat or read it alone slowly.

E. Alternate *C* and *D*, a few sentences of each.

F. Read conversation (dramas, traveler's manual, etc.) slowly with another person.

G. Free conversation, question and answer.

16. *Metronome Exercise* (p. 85)

A. Speak sentences to a metronome beating 54 to a minute, with one syllable to each beat.

B. Statement and question exercise likewise (see note to Exercise 6).

C. Tell a connected story likewise, such as what you had for breakfast, how you spent last summer, etc.

D. Repeat *A*, *B*, *C* while some one holds the finger on the metronome ready to act whenever you speak too fast.

E. Repeat *A*, *B*, *C*, *D* without the metronome.

F. Repeat *A*, *B*, *C*, *D* without the metronome, taking care to eliminate all jerkiness of speech.

17. *Speaking with Sticks*

A. Repeat sentences, striking the stick to each emphatic vowel and keeping time with the metronome at 54 a minute.

B. Same without the metronome.

C. Question and answer likewise (see note to Exercise 6).

D. Same without the metronome.

E. Tell a story about breakfast, etc., keeping time to the metronome.

SET V

SMOOTHNESS

18. *Linking*

A. Repeat and read sentences, linking all the words together, that is, making no pause or interruption between the different words. The whole sentence should be spoken as if it were one word, or just as in French. "Thecoverofthebookisred." "Thecarpetonthefloorisgreen." "Theelectriclightisveryconvenient." "TheturkeycomesonThanksgivingDay."

B. Repeat and read short stories likewise.

C. Repeat sentences and answer questions likewise.

19. *Vowel Start*

A. Read sentences, making the first important vowel in each sentence at least three times as long as usual. Speak it with the octave twist. Speak the rest of the sentence as described in the exercise on "Linking."

B. Read likewise.

C. Repeat sentences and answer questions likewise.

D. Conversation likewise.

SET VI

VOICE QUALITY (p. 81)

20. *Tone Placing by Chanting*

A. Chant one line of a poem or a prose statement on one note.

B. Repeat this on other notes.

C. Same, dropping to a lower note on the last word.

D. Same, short story.

E. Same, statements, question and answer.

21. *Tone Placing with "Bee-bee-bee"*

A. Strike middle *c* and sing "bee-bee-bee," making the vowel sharp as in the French word "pique"; this is far more sharp than the English word "peek." Go up the scale for an octave in the same way.

B. Same with "bee-ah."

C. Same with "bee-ay."

D. Same with "bee-oh."

E. Same with "bee-you."

F. Same with "bah."

G. Same with "bay."

H. Same with "boh."

I. Same with "bou."

All these vowels should be sung in a ringing, very slightly nasal tone, that is, in what is termed a "forward tone."

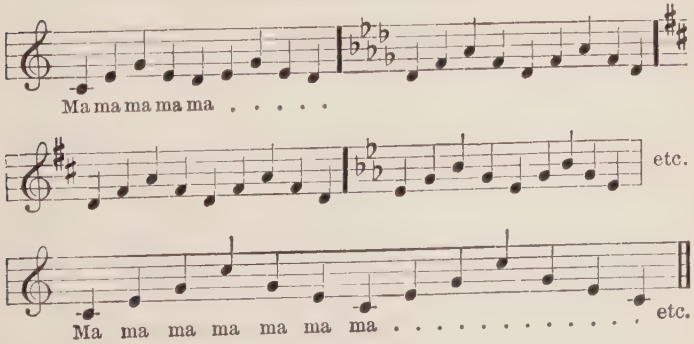
22. *Tone Placing with "Ma"*

A. Strike middle *c* and sing "mmmmmmaaaaaah." Hold "m" until the vibrations are felt strongly on the lips; then simply open the mouth to let the "ah" out, being careful to keep the same quality of tone as in "m." For a high voice begin above middle *c*.

B. Repeat up the scale for an octave.

C. Same with "mee"; same with "moh"; same with "moo."

D. Repeat on arpeggios of three and four notes.



23. *Husky Tone*

A. Strike middle *c* and sing "ah," beginning and ending it with the glottal catch (p. 81). Continue up the scale.

B. Sing arpeggios likewise.

C. Sing "ah" to the notes of a song likewise.

D. Sing a song, cutting all the words sharply apart.

24. *Trumpet and Megaphone*

A. Hold a small trumpet to your lips. Shout through it the phrase "Pie-apples, ten cents a water pail," using the sharp tones that would be used by a peddler calling out on the street. Use other phrases in the same way, for example, "Nice fresh strawberries."

B. Call out railway stations in a similar way.

C. Same with a small megaphone. Note that you have to make somewhat more of an effort to get the sharpness with the megaphone.

D. Repeat all the preceding without anything before the mouth. Make a special effort to get the sharp ringing tone.

SET VII

STARTING AND ENDING SENTENCES

25. *Strengthening the First Word*

A. Sing short sentences, striking a note on the piano as you sing the first syllable. Instead of using the piano you may strike a bell or a table or you may hit your knee or make a gesture as in beating time.

B. Repeat the same sentences, with the same accompaniment in the same way, but singing only the first word.

C. Speak them with the same accompaniment on the first syllable.

D. Question and answer are sung with the accompaniment on the first syllable.

E. As before, but only the first syllable sung, the rest being spoken.

F. As before, but all spoken.

G. Tell a story, singing the first word of each sentence with the accompaniment.

H. Tell a story without singing, but accompanying each first syllable.

26. *Emphasizing Periods*

A. Read short sentences, striking a bell or a piano note at the period.

B. Read a story likewise.

C. Question and answer likewise.

D. Tell a story likewise.

E. Raise a heavy weight in the hand and hold it till a period is reached. Read and speak sentences, stories, etc.

27. *Lowering Tones at the End*

A. Chant sentences on one note, but drop by a fifth — *sol* to *do* — on the last syllable. Use the piano at first, but gradually omit it.

B. Speak sentences on a rather high tone, and drop on the last word.

28. *Clear Endings*

A. Sing sentences, cutting the last word short with the glottal catch.

B. Speak sentences, singing the last word sharply.

C. Speak sentences, making sure that the last syllable is sharp.

SET VIII

ENUNCIATION AND SPELLING (p. 88)

29. *Typical Sounds* (p. 117)

A. Indicate by printed or written letters on paper, blackboard, or chart the typical explosives "p, b, d, t, k, g"; show their explosions by paper flags or the breath indicator (pp. 153, 119).

B. Indicate the typical fricatives "f, v, s, z, sh, th."

C. Indicate the occlusive-fricatives "ch and j."

D. Indicate the nasals "m, n, ng," showing that air issues through the nose.

E. Indicate the liquids "l, r."

F. Indicate the semi-vowels "w, y."

30. *Combination of Sounds into Syllables*

A. Combine each of the explosives "p, b, t, d, k, g" with various vowels; indicate the result on paper, blackboard, or chart and speak it at the same time; thus, "pa, pay, pee, po, pu, ba, bay, bee, bo, boo," etc.

B. Same with fricatives and the other sounds of the previous exercise; thus "fa, fay, fee, fo, foo, va, vay, vee, vo, voo," etc.

C. Form syllables with explosives followed by "r" and the vowels: thus, "pray, pree, pro, proo, bray, bree, bro, broo," etc.

D. Same with "l" instead of "r"; thus, "play, plee, plo, ploo, blay, blee, blo, bloo," etc.

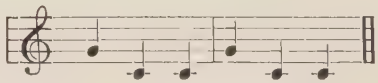
31. *Division of Words into Syllables* (p. 88)

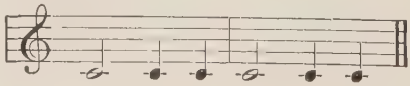
A. Learn to spell words, dividing them into syllables according to the dictionary. Pronounce each syllable separately, for example, "a-c, ac, c-e-l, cel, e-r, er, a-t-e, ate, accelerate."

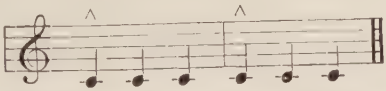
SET IX

EXPRESSION

32. *Giving the Idea of Emphasis*

A. Sing "ah" with notes on the piano as indicated.

This gives an idea of emphasis by change in pitch.

B. Sing "ah" on one note but with different lengths as indicated.

This gives the idea of emphasis by change of length.

C. Sing 'ah" on the same note and with the same length, making the first one of each group of three louder than the others.

This gives the idea of emphasis by change in loudness.

33. *Developing Expression*

In each of the following exercises the instructor first shows the pupil just what he is to do. He criticizes the pupil's deficiency, and imitates him where he fails to get the proper expression.

A. Repeat a poem with expression.

B. State a certain fact in a very melodious and expressive way.

C. When the instructor gives a question in a very melodious and expressive voice, answer it by taking a few words from the question.

D. As before, but answer freely with the same melody and expression as in the question.

E. Recite poems and prose pieces with proper expression.

F. Read dialogues with the proper change of expression for each character.

G. Read and speak jokes with an effort to give the most effective expression.

SET X

CONFIDENCE (p. 90)

34. *Reading Together* (pp. 62, 94)

A. Read a poem together with the instructor. Read alternate lines together and alone.

B. Same with sentences.

C. Read a prose speech together; the instructor is to remain silent occasionally.

D. Read a prose piece; the instructor is to join in at the first intimation of difficulty.

E. Read statements and questions sometimes together, sometimes alone (see note to Exercise 6).

F. Read parts in a drama; the instructor joins in whenever the pupil has difficulty.

G. Read a paragraph, and then tell its contents in your own language; the instructor joins in wherever there is any difficulty.

35. *Speaking Together* (p. 62)

A. Repeat a poem in unison with another person, speaking slowly.

B. Repeat it alone slowly.

C. Repeat a prose piece with another person slowly.

D. Repeat it alone slowly.

36. *Reading with Decided Voice* (p. 98)

A. Call off the railroad stations from a time-table through the megaphone. The voice must ring out clearly and decidedly.

B. Same without the megaphone.

C. Read headlines from a newspaper in a similar way.

D. Read short sentences likewise.

E. Read short poems likewise.

F. Read short prose pieces likewise.

G. Read jokes likewise.

Speaking with Confidence (pp. 94, 95)

A. Call out railroad stations with the megaphone; the voice must be clear and decided.

B. Same without the megaphone.

C. Make geographical statements with and without

the megaphone; for example, "The Atlantic Ocean is east of the United States."

D. Make historical statements likewise (that is, with and without the megaphone); for example, "George Washington was the first president of the United States."

E. Question and answer likewise.

F. Relate a story of an incident likewise.

G. Make a speech likewise.

H. Take part in a debate likewise.

I. Take part in a continuous story which is arranged as follows: One person tells a story which he makes up as he goes along; he suddenly stops, and the next person is immediately to continue the story according to his own ideas; he, in turn, suddenly stops and the following person continues. This is kept up until the story reaches the first person.

38. *Buying* (p. 96)

A. You are supposed to be a storekeeper with a number of objects before you; other people go to the store, inquire about articles, discuss the prices and buy. This must all be done with proper attention to slowness and melody of speech.

B. Take the part of the buyer.

C. The store is turned into a railroad ticket office with yourself alternately as ticket agent and as traveler. Various questions concerning trains, accommodations, etc., are to be asked.

D. The ticket office becomes the box office at the theater; the questions are to include location and seats, exchange of tickets, etc.

39. *Introducing* (p. 63)

A. The instructor introduces himself to you; you reply, "I am glad to meet you."

B. Introduce yourself to the instructor.

C. The instructor introduces some other person to you, you reply "I am glad to meet you" or "How do you do?"

D. The instructor introduces you to another person; you say "How do you do?"

E. Introduce yourself to another person.

F. Introduce the instructor to different persons.

G. Introduce different persons to the instructor.

H. Introduce two familiar persons to each other.

I. Introduce strangers to each other.

As much as possible the stutterer should feel that

the instructor is at hand to speak for him in case of any difficulty.

40. *Public Speaking* (p. 95)

A. Prepare a short speech to make on an assigned topic, and deliver it in the presence of the instructor.

B. Same in the presence of several people.

C. Make an impromptu speech on a given topic in the presence of the instructor.

D. Same in the presence of other people.

The number of the people is to be gradually increased until the stutterer feels ready to get up at any moment and make a short speech on any topic.

41. *Scenes from Life* (p. 95)

A. A group of people is supposed to be in some familiar situation; for example, eating at a restaurant, riding in an automobile, forming a box party at the theater, etc. The instructor works out the situation by description, while the persons, including the pupil, make the appropriate remarks. For example, if the scene is at the restaurant, the instructor takes the part of the waiter, while the other persons order what they wish to eat, discuss the bill of fare, etc. If the scene is at the theater, the instructor tells a

story of the play while the persons discuss the incident, the house, their neighbors etc. In the automobile party, the instructor takes the part of the chauffeur while the party travels to various places and discusses what he has seen.

B. Similar scenes are worked out, the patient taking the leading part.

C. The group of persons is supposed to represent a club, the instructor occupying the chair. Various members are to make motions and discuss them, officers are to be elected, etc.

D. The stutterer is made chairman of the club.

42. *School Work* (p. 96)

A. The stutterer is to prepare and recite to the instructor some of his school exercises.

B. He is to do the same before several people.

C. The group is to be gradually increased till it forms quite a class. The instructor is to be the teacher and is to call on the patient or patients to recite.

D. The exercise is transferred to a schoolroom.

E. Outside teachers are called in to conduct the class.

SET XI

SPONTANEOUS SPEECH

43. *Collection of Ideas* (pp. 14, 19, 62)

A. Say some word referring to an object placed before you or pointed out; the word must have some application to or connection with the object. You may say "large" referring to its size, or "black" referring to its color, or "read" referring to its use, or "table" referring to its position, or "yesterday" referring to something it reminded you of, etc.

B. Make a statement slowly and melodiously concerning some object placed before you or pointed out to you.

C. Name the objects you see on one side of the room, proceeding systematically from left to right and speaking slowly and melodiously.

D. Describe an object placed in front of you, using single words and proceeding systematically; for example, if a telephone is placed before you, you will first use words referring to its appearance, then to its use, then to its faults, then to its history, etc. Always adopt some such system in selecting words.

E. Same as *D*, but complete sentences are to be used instead of single words.

F. Short sentences are to be spoken concerning objects not seen but more or less familiar; for example, breakfast, a distant city, George Washington, Atlantic Ocean, etc.

G. A more extended account is required concerning similar objects, as in *F*.

44. *Increasing the Embarrassment* (p. 62)

A. Part or all of the preceding exercise is to be carried out in the presence of additional people.

B. When this can be done perfectly, you are to be called on to make short speeches on topics that have been given you before.

C. You are to make speeches on topics of your own choosing.

SET XII

THINKING (p. 86)

45. *Single Associations of Ideas*

A. The name of an object is called out. You call out the name of some other object that suggests itself to your mind. If you are in doubt what to say,

choose some object that is often seen together with the one mentioned. For example, on hearing the word "horse" you reply "cart." This process is called "association of ideas." For the present you are to associate slowly, taking as much time as you wish. Practice for several times with the following list of words; then add other words.

hand	foot	hair
shoe	glove	eye
coat	sock	motor
tooth	nose	water
boat	canoe	whip
sail	pin	wheel
rope	seat	road
pump	lake	ticket
lamp	bell	dance
theater	hotel	ring
piano	gun	bell
street	head	muscle
school	collar	pencil

B. Upon hearing each of the words just used, make a sentence about it. It does not matter what the sentence states.

C. Upon hearing each of the words make a sentence defining it.

D. Upon hearing each of the words state some fact about the object implying something in regard to its location or its use, or something that preceded it, or caused it, or followed it, or resulted from it, or had some relation to it.

46. *Running Associations*

Starting with any given word, let the mind bring up a long series of thoughts. These thoughts should not revolve around the original word, but should pass away into other subjects. If necessary, the rule may be adopted of obliging the mind to leave the original word within three associations.

SET XIII

DESCRIPTION AND RELATION

47. *Description* (p. 19)

A. Describe an object placed before you; if you have any difficulty, you are to adopt some system, such as proceeding from top to bottom or according to cause and effect, etc.

B. Same with simple pictures.

C. Same with complicated pictures.

D. Same with what you see in the room or out of the window.

E. Same with a simple topic from memory, such as breakfast this morning, house where you live, school, well-known buildings, etc.

F. Same with a longer experience, such as a journey, a visit to a theater, the plot of a story, etc.

G. All the preceding exercises are to be performed in the presence of one other person, then two, and so on.

48. *Relation*

A. Read aloud a short story, for example, one of Æsop's fables; then with the book open before you relate the contents of the story.

B. Same with the book closed.

C. Relate some story that you have previously read, for example, Robinson Crusoe, Cinderella, etc.

D. Same with some previous experiences, such as last summer, last Christmas, etc.

E. Read a joke and then tell it.

F. Tell some funny story that you read some time ago.

G. Tell what you would like to do next summer, next Christmas, etc.

H. All these exercises are to be done in the presence of one additional person, then two persons, etc.

I. Pretend that you are conducting a scene in vaudeville.

SET XIV

TELEPHONING (p. 96)

49. *Private Line*

A. Call up some one on the private telephone, using the system of your town as nearly as possible. First call "central," and then speak with the person desired. You are to speak slowly and melodiously.

B. Take the part of "central" and then of the person called up.

C. Repeat *A* and *B* in the presence of other people.

D. Do some of the most difficult exercises over the telephone with the instructor or some other person at the other end.

50. *Main Line*

A. Put your finger on the telephone switch so that when you take the receiver off the hook, the

telephone is not connected with "central." Some one sitting beside you takes the part of "central" and the person to whom you wish to speak. Carry out exercises as on the private line.

B. With the instructor close beside you, call up "central" and then some friends; if you have the slightest hesitation, the instructor will speak for you.

C. When you succeed perfectly as in *B*, try the telephone independently. The instructor is to criticize your success.

SET XV

TALKING WITH PEOPLE (p. 90)

51. *General Conversation*

A. In a group of two people, talk on assigned topics of conversation, with material prepared beforehand.

B. Then with three people, and so on, gradually increasing the number in the group.

C. Gradually bring in strangers.

D. Same as *A*, with topics not prepared beforehand (impromptu conversation).

E. Same with three or more people.

F. Same with strangers.

52. *Coolness in Argument*

A. Argue a question with the instructor.

B. Argue a question with somebody else.

C. Argue a question in a group of three.

D. Debate a topic with some person before a small group.

E. Debate a political question with interruptions from the audience.

53. *Transacting Business*

A. Sitting at a desk, you ring a bell as a signal for a person to enter. As he approaches your desk, you greet him and ask him what he wants. If he is applying for a position, inquire into his qualifications and then dismiss him; if he wants to buy or sell or transact some other business, you are to promptly settle the matter, speaking very slowly and melodiously. A series of persons is interviewed in like manner.

B. You are to take the part of the person entering the office for business.

SET XVI

RELAXATION (p. 61)

54. *General Relaxation*

A. Lie on a couch, close your eyes, and purposely try to relax every limb.

B. Some one passes his hands over the various limbs, feeling that the muscles are all relaxed. This is repeated four or five times at intervals of about fifteen minutes.

C. Get your mind fixed on the thought of relaxation and quietness. Lie perfectly quiet in this way for five minutes on the first occasion, for ten minutes on the next, and so on for an increasing length of time up to a half hour.

55. *Speaking*

A. You are to lie on a couch in a relaxed condition. Some one speaks a sentence to you very slowly and melodiously; you are to repeat it likewise.

B. Repeat sentences and reply to questions in the usual way (p. 92).

C. Exercises in description and relation (p. 219) are carried out in this relaxed condition.

SET XVII

MUSCULAR CONTROL

56. *Tongue Gymnastics* (p. 160)

A. Thrust the tongue out and draw it back quickly; do the same slowly.

B. Move the tongue from side to side outside of the mouth, first slowly, then quickly.

C. Same inside of the mouth.

D. Touch the point of the tongue to the upper lip.

E. Touch the point of the tongue to the roof of mouth, keeping the mouth open; same with the mouth shut.

F. Touch the point of the tongue to the upper front teeth.

G. Place the thumb and finger on each side of the tongue; broaden and narrow the tongue by use of the muscles within the tongue; this is felt by the fingers.

H. Place the thumb and finger below and above the tongue; repeatedly thicken the tongue; this is felt by the fingers.

57. *Lip Gymnastics*

A. Without projecting the lips, alternately contract them to a round circle while saying "oh," and draw the corners back while saying "eh."

B. Same, on different tones.

C. Same, speaking sentences.

58. *Relaxing the Jaw* (p. 83)

A. Place the hands at the back of the cheeks; notice the swelling of the masseter muscles during speech; relax them by dropping the jaw.

B. Speak the vowels, dropping the jaw at the same time.

C. Speak sentences, dropping the jaw as much as possible.

D. Leave the mouth open for long periods of time.

59. *Fixation of the Larynx* (p. 83)

A. With the fingers, press backward and downward on the hyoid bone; resist its rising while you pretend to swallow.

B. Sing "ah," pressing the hyoid bone backward; alternate in singing "ah" with and without pressing.

Try to make the "ah" without pressing sound like the "ah" with pressing.

C. Speak vowels, words, and phrases as in *B.*

60. *Jaw Position*

A. Insert two fingers vertically between the teeth; speak the vowels in this position; speak sentences also.

B. While looking in a mirror, speak all the vowels, keeping the mouth as widely open as before, or nearly so.

C. With the mirror, speak sentences, opening the mouth as widely as before on the broad vowels, such as "ah" and "oh."

61. *Rear Palatal Arch* (p. 84)

A. Look in the mirror; observe the rear palatal arch; whisper "ah" softly and loudly alternately; observe that the arch is narrow for the loud whisper.

B. Try to narrow the arch by a voluntary effort without whispering.

C. When the ability to narrow the arch is obtained, sing out a loud "ah" at the moment of narrowing.

D. Same with other vowels.

E. Same, speaking the vowels.

SET XVIII

WORD LISTS

62. *Words beginning with "p"*

pack	pay	pie	play	post
pad	peel	piece	plum	pound
paint	pear	pink	point	pour
pair	pen	plain	pole	preach

63. *Words ending with "p"*

ape	deep	help	loop	rope
cape	drape	keep	map	stop
cap	grape	lap	mop	tape
cheap	hope	leap	nape	top

64. *Words with "p" in the middle*

appeal	approach	dipper	lisping	reply
appear	apron	dripping	repeat	report
apple	chapel	happen	repel	reproach
appoint	clapper	helping	repent	ripple

65. *Words beginning with "b"*

bad	band	bead	bend	bite
bag	bank	bear	bet	black
bake	bark	bed	bill	blank
ball	bat	bee	bind	bloom

66. *Words ending with "b"*

Arab	crab	drab	sob	tub
babe	crib	garb	stab	tube
bribe	cube	grab	stub	verb
cab	daub	probe	tab	web

67. *Words with "b" in the middle*

cable	lobster	obey	obtain	rubber
dribble	marble	object	rabbit	stumble
fable	medal	obscure	ribbon	tumble
labor	nibble	observe	robbin	warble

68. *Words beginning with "t"*

table	tame	tell	town	trust
tack	tape	test	trade	tune
take	taste	toe	train	twist
talk	tea	top	trunk	twine

69. *Words ending with "t"*

at	boat	fat	not	rate
ate	cat	fit	nut	rust
bat	coat	get	ought	what
bit	eat	hit	put	wet

70. *Words with "t" in the middle*

attach	attire	fatal	mutter	tattle
attack	battle	fitting	outer	utter
attain	bitter	letter	patter	vital
attend	butter	matter	rattle	water

71. *Words beginning with "d"*

dance	date	debt	desk	dive
dare	day	deep	dew	dog
dark	dead	dell	dim	doll
dash	deaf	depth	dine	draft

72. *Words ending with "d"*

add	fed	lid	mud	road
bad	glad	load	odd	rude
bed	had	mad	pad	sad
bid	lead	made	raid	sled

73. *Words with "d" in the middle*

address	bondage	childish	endless	fiddle
adept	boulder	conduct	fading	gladden
binding	cadet	cradle	federal	harden
bundle	cedar	edition	feeding	widen

74. *Words beginning with "k"*

cab	crop	cuff	keep	kind
catch	cross	cup	key	king
care	cry	cure	kick	kiss
creep	cube	cut	kill	kite

75. *Words ending with "k"*

ache	bleak	flake	neck	pick
bake	cake	kick	oak	pluck
beak	duck	like	pack	risk
beck	drake	make	peck	stick

76. *Words with "k" in the middle*

aching	flicker	looking	occur	raking
baker	knuckle	market	package	scrape
barking	leaking	masker	picture	scream
drinking	locket	milky	picnic	screw

77. *Words beginning with "g"*

gain	gay	girl	glance	globe
game	get	give	glare	glow
gas	gift	glad	glass	go
gate	gild	glade	gleam	gold

78. *Words ending with "g"*

bag	clog	egg	pig	tag
beg	dig	fog	rag	tongue
big	dog	frog	rug	tug
bug	drag	mug	sting	wig

79. *Words with "g" in the middle*

again	agony	argue	bungle	longer
aggrieve	agree	baggage	digging	organ
aghast	anger	braggart	dragging	program
aglow	angle	bugle	laggard	rugged

80. *Words beginning with "ch"*

chain	chap	cheer	chill	chisel
chair	cheap	chicken	chimney	chocolate
chalk	cheat	chief	chin	choke
change	check	child	chip	chop

81. *Words ending with "ch"*

batch	crutch	much	pitch	Scotch
beach	grouch	notch	pouch	screech
botch	latch	peach	preach	smirch
church	lurch	perch	reach	such

82. *Words with "ch" in the middle*

bleaching	hitching	perching	Scotchman	twitching
butcher	itching	pitcher	screeching	urchin
etcher	latching	preacher	searching	watcher
fetching	lurching	scorching	teacher	witching

83. *Words beginning with "j"*

Jack	jaw	jig	joint	jug
jail	jerk	job	joke	jump
jam	jet	jockey	jury	joy
jar	jewel	John	judge	justice

84. *Words ending with "j"*

age	dodge	hedge	porridge	sledge
bridge	dredge	judge	purge	smudge
budge	edge	lodge	rage	stage
courage	fringe	marriage	sage	urge

85. *Words with "j" in the middle*

adjoin	engaging	language	regent	Roger
arranging	enjoy	luggage	reject	stranger
baggage	ginger	manger	rejoice	tinged
conjurer	injury	prodigious	religious	unjust

86. *Words beginning with "f"*

face	fair	fame	fast	fight
fact	faith	fan	fault	fine
fail	fall	fare	feel	fire
faint	false	farm	fell	fish

87. *Words ending with "f"*

bluff	elf	hoof	life	rough
chafe	grief	if	muff	safe
cliff	gruff	laugh	off	snuff
cuff	half	leaf	puff	stuff

88. *Words with "f" in the middle*

affair	buffet	effect	lofty	puffy
affect	coffee	effort	offer	roughen
afford	differ	laughter	office	stuffy
afraid	efface	lifting	often	toughen

89. *Words beginning with "v"*

vague	van	vain	voice	value
vain	vast	verb	void	vapor
vale	vault	vest	vote	very
valve	veil	vine	valley	vigor

90. *Words ending with "v"*

above	dive	glove	live	save
brave	drive	groove	move	valve
cave	five	grove	pave	wave
crave	give	have	rave	weave

91. *Words with "v" in the middle*

braver	event	evince	having	never
diving	ever	favor	level	over
evade	every	fever	lever	river
even	evil	flavor	movement	silver

92. *Words beginning with "s"*

sack	same	seed	sin	slate
sad	school	sell	since	slave
safe	scrub	set	sit	sleep
sail	sea	silk	skate	slice

93. *Words ending with "s"*

base	dress	kiss	loose	race
brass	face	lace	miss	rice
case	grease	lease	moss	slice
crease	hiss	loss	place	us

94. *Words with "s" in the middle*

ascent	assign	astray	dresser	listen
aside	assist	basket	essay	loosen
asleep	assure	biscuit	essence	master
assay	astir	casket	fasten	tasty

95. *Words beginning with "z"*

zeal	zone	zenith	zither	zoölogy
zest	zoo	zero	Zion	Zeus
zinc	zebra	zigzag	zouave	Zulu
zodiac	zephyr		zounds	

96. *Words ending with "z"*

bees	daze	his	maze	seize
breeze	freeze	has	nose	size
cries	graze	haze	praise	tease
craze	hers	lose	rise	trees

97. *Words with "z" in the middle*

busy	dizzy	grisly	losing	result
breezy	dozen	hazy	nasal	resume
bruising	fuzzy	lazy	prison	scissors
cozy	freezing	lizard	prize	weasel

98. *Words beginning with "sh" (surd)*

shade	shame	shed	ship	shore
shaft	shape	sheet	shock	short
shake	share	shelf	shoot	show
shall	sharp	shell	shop	shut

99. *Words ending with "sh" (surd)*

ash	dish	lash	rash	trash
bush	fish	mash	sash	thrush
cash	flash	push	slash	wash
dash	fresh	plush	smash	wish

100. *Words with "sh" (surd) in the middle*

ashes	bushel	crashing	flashing	rashly
bashful	bushy	crushing	flushing	rushing
blushing	cashier	dashing	hushing	washing
brushes	clinching	fishy	freshness	pushing

101. *Words with "sh" (sonant)*

adhesion	delusion	evasion	Parisian	seizure
azure	derision	invasion	pervasion	treasure
cohesion	division	leisure	pleasure	vision
decision	elision	measure	precision	visual

102. *Words beginning with "th" (surd)*

thank	thin	thirst	three	throb
thaw	thing	thorn	thrift	throw
thick	think	thought	thrill	thrust
thief	third	thread	throat	thud

103. *Words ending with "th" (surd)*

bath	broth	faith	month	tooth
blithe	death	fourth	moth	width
both	depth	fifth	mouth	wrath
breath	earth	lithe	path	wroth

104. *Words with "th" (surd) in the middle*

athirst	bathos	ethereal	monthly	southerly
athlete	earthly	lengthen	pathway	strengthen
athwart	Ethel	Matthew	pathetic	youth
author	ether	method	pathos	zither

105. *Words beginning with "th" (sonant)*

than	them	they	this	thus
that	then	these	thou	they
the	there	thine	though	therefore

106. *Words ending with "th" (sonant)*

bathe	clothe	lathe	soothe
breathe	swathe	smooth	loathe

107. *Words with "th" (sonant) in the middle*

another	brother	further	lather	panther
bathing	either	gather	leather	rather
bother	father	heather	neither	together
breathing	feather	mother	other	weather

108. *Words beginning with "w"*

wad	weak	wish	willow	wafer
wag	wealth	wit	wily	wager
waif	wear	wolf	wince	wagon
wail	wax	worn	wife	waffle

109. *Words with "w" in the middle*

awake	bower	jewel	rower	towel
aware	cower	lower	sewer	tower
bewail	dowry	mowing	slower	trowel
bewitch	fewer	power	sowing	vowel

110. *Words beginning with "y"*

yacht	yawn	yeast	yes	yoke
yard	ye	yell	yesterday	you
yarn	year	yellow	yet	young
yawl	yearn	yelp	yield	youth

111. *Words beginning with "r"*

race	rasp	rid	rob	rule
rack	rat	ride	robe	run
raft	rate	ridge	rock	rung
rag	rave	rig	rod	rush

112. *Words with "r" between vowels*

arrow	errand	marry	narrow	terrace
berry	ferry	merry	parrot	terror
current	garret	mirror	pirate	turret
direct	hurry	moral	sorry	worry

113. *Words with "r" after a consonant*

braid	bread	drive	dry	fruit
branch	break	droop	fraud	fry
brass	crab	drop	free	grape
brave	drip	drum	frost	grease

114. *Words beginning with "l"*

lad	leaf	let	lion	long
lake	leak	lick	lip	loose
lame	lean	lie	live	lot
lamp	left	limp	loaf	low

115. *Words ending with "l"*

animal	avail	bell	call	deal
annual	owl	bewail	camel	dial
appal	bail	bill	cereal	eel
appeal	bawl	boil	chill	fool

116. *Words with "l" between vowels*

alarm	along	elegant	eleven	illegal
alert	aloud	element	elope	illumine
allow	alum	elephant	eloquent	illusion
alley	elect	elevate	island	olive

117. *Words beginning with "m"*

machine	magnet	major	man	milk
mad	maiden	maker	measure	monkey
made	mail	malice	meat	move
magic	mane	mama	meal	must

118. *Words ending with "m"*

aim	gleam	jam	ream	some
beam	gloom	lamb	rim	swim
comb	gum	limb	room	thumb
come	home	ram	seam	Tom

119. *Words with "m" in the middle*

amaze	company	limit	murmur	summer
amount	dreamer	mama	plumber	summit
bemoan	former	mimic	roomy	swimmer
comma	hammer	moment	steamer	trimming

120. *Words beginning with "n"*

name	niece	no	north	nudge
neck	niche	nod	not	number
nest	night	noon	note	nurse
nice	nine	noose	now	nutshell

121. *Words ending with "n"*

alone	dawn	John	pine	run
balloon	fine	moan	pint	ruin
bean	gone	moon	prune	sun
brine	gun	pan	rain	win

122. *Words with "n" in the middle*

Annie	corner	honor	panel	tender
banner	counter	lining	render	whining
bonny	dinner	money	running	winner
briney	fountain	only	sooner	wonder

123. *Words with "ng"*

ailing	covering	having	nothing	ringing
bending	caring	killing	pudding	singer
being	counting	laughing	remaining	willing
bringer	crawling	living	ring	wringer

PART IV

NEW METHODS OF CORRECTING THE SPEECH OF THE DEAF

CHAPTER I

THE ORGAN TRAINER

THE tone of the voice, or the laryngeal tone, is always imperfect in the deaf, even after the best instruction. It is too weak or too loud, too husky

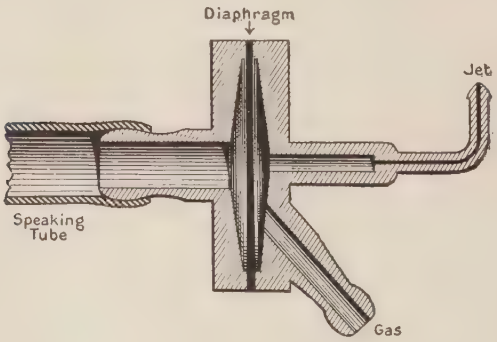


FIG. 104.—Gas capsule.

or too breathy or too tight, too high or too low, etc. It is always monotonous and devoid of melody.

Using a principle of experimental phonetics, I will

describe one method of overcoming the monotony of the voice.

In the first place, it is necessary for the reader to become familiar with a method of showing the vibrations of the voice to the eye that will be used

Fig. 105.—Gas capsule in use with a revolving mirror.

frequently. Figure 105 shows what may be termed a "flame box"; it is a form of the "manometric capsule," devised by Koenig of Paris. The box is divided into two parts by a diaphragm of rubber or mica. On one side illuminating gas or acetylene enters and issues as a small flame; the other side is

connected by a tube to a mouthpiece. When a person sings into the mouthpiece, the vibrations of his voice shake the diaphragm. This causes the gas at the jet to issue in waves. The flame thus repeats the vibrations of the voice. When the flame is observed in a revolving mirror (Fig. 105),

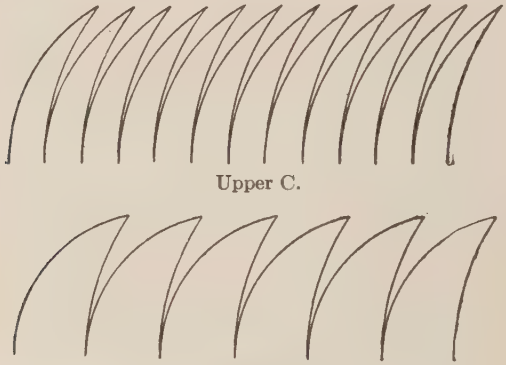


FIG. 106.—Flame figures for two tones an octave apart.

the vibrations can be seen separately. They are narrow for a high tone, broad for a low one. Figure 106 shows the flames for middle C twice as broad as those for upper C.

The apparatus shown in Figure 107 may appropriately be termed the "Organ Trainer." It comprises two "flame boxes" placed close together. One of these is connected to an organ in such a

way that the vibrations of the reeds are communicated to the flame. The person sings in the other one. When the mirror is turned, two bands of vibrations are seen.

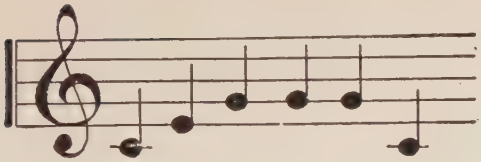
Fig. 107.—The organ trainer.

It is easy to make the deaf child understand that his flame vibrations must match the organ vibrations. When middle C is played, his vibrations must be wide. He naturally tries all sorts of tones,

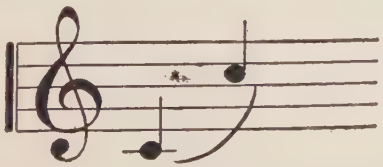
but is soon able to make a tone with wide vibrations—that is, he sings middle C. With upper C he tries till he matches the finer vibrations.

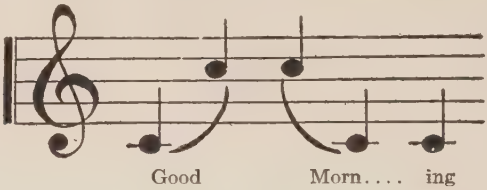
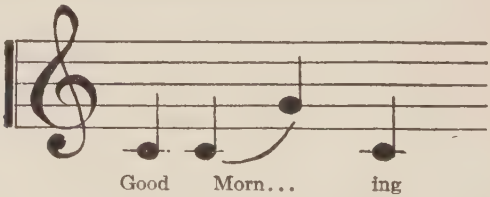
This method enables us, in the first place, to get the voice of the deaf within the right ranges of pitch. A little girl of 12 years, with a deep bass that would do credit to a pilot, readily learns to speak in a high tone. A boy of 16 with a shrill falsetto can be made to use a man's voice. I have tried this method on a large number of deaf pupils and have been able to get every one of them to sing and speak in tones appropriate to sex and age.

This method makes it possible, also, to introduce some modulation into the speech of the deaf. If the pupil learns only two tones—middle C and upper C— his speech will be pleasanter than if he has absolute monotony. It is, however, not difficult to teach three or four or even five tones with this apparatus. In this way quite as much modulation can be taught as the ordinary American citizen is accustomed to use. For example, it is not difficult to get an intelligent child to say



It is possible to do even more. Researches in experimental phonetics have proven that the laryngeal tone is never—absolutely never—constant in pitch for a single instant. It is always rising and falling even in the shortest vowel that can be spoken. Can some of this inflection be taught to the deaf?

If the notes of an octave are played rapidly in succession, the eye sees the flame vibrations grow steadily narrower. The pupil gets, with astonishing ease, the idea of sliding his voice up over the octave instead of making a sudden jump. In fact, it is much easier to sing an octave interval "portamento" thus

than to make a sudden jump from middle C to

upper C. This "octave twist," or "octave glide," can be readily introduced into words. Finally, the pupil can be taught to speak sentences with octave glides; for example:

When a child can do this, he is taught to modulate his voice within a smaller range in the most varied ways. For example, he can learn to use a more natural inflection, such as the following:

The result of all this training is a marvelous change from the disagreeable monotony of the deaf to an agreeable inflection.

This method puts into practice the fundamental principles of "control of the voice by the eye as a means of teaching control of the voice by the muscle sense." The pupil sees the result he has

to obtain. He feels around with the muscles of his larynx until he gets the right result. This he does again and again till the sensations in his muscles guide him in just what he has to do. When he has once learned how, he can use his voice just as well as a normal person.

CHAPTER II

THE STROBILION

The strobilion is an apparatus for teaching control of the pitch of the voice by means of sight.

The disc shown in Fig. 108 consists of 15 rings of alternating white and black spaces. The inner ring has eight white spaces, the next has nine, etc. The entire series is 8, 9, 10, 10⅔, 12, 13⅓, 15, 16, 18, 20, 21⅓, 24, 26⅔, 30, 32. These numbers correspond to the relations of vibrations in the diatonic scale. Thus, if "do" is a note having eight vibrations a second, "re" will have nine, "mi" will have ten, etc.

In front of the disc there is a scale marked with the syllables "do, re, mi," etc., opposite the corresponding rings.

The disc is fixed on the axle of an electric motor, whose speed can be regulated by resistance. When the motor is set going, the disc revolves and its entire surface appears an even gray.

The disc is illuminated by a small flame from a flame box supplied by acetylene. The construction of this flame box is described in the preceding

Fig. 108.—The Strobilion

chapter. The membrane in the box must be of thin mica in this apparatus.

When a tone is sung into the mouthpiece of the flame box, the flame vibration produces a series

of flashes of light. The disc is illuminated as many times a second as there are vibrations in the tone sung. Between the illuminations there is darkness.

9.—The Strobilion disc, illuminated by an intermittent flame, hose flashes make the middle ring appear to stand still.

If the white spaces of any ring of the disc are passing the flame at a rate equal to the number of vibrations of the tone, that ring will split up into

a series of white and black spaces that appear to stand still (Fig. 109). All of the other rings will remain gray. The reason for this is that the eye sees the space only by flashes. At one flash of light the white disc of a certain ring is seen, for example, at the top. During the darkness before the next flash it moves forward. If the next flash occurs at the moment the next white space has moved to the top, the eye perceives no movement, and the observer sees the second white space where the first was. At the next flash the third white space has moved to the top, and so on. Consequently the observer sees a white space at the top and other white and black spaces around the ring just the same as if the ring actually stood still. This will be true only of one ring, namely, the one whose white spaces move exactly in agreement with the flashes.

The resistance, with the motor, is arranged to give great changes of speed. If the disc is made to revolve 16 times a second, the number of spaces passing the flame in a second will be 16 x 8; this gives 128 in the inner ring, 144 in the second ring, and so on, up to 512 in the outer ring. If the

speed of the motor is increased to 20, there will be 160 in the inner ring, 180 in the second, and so on. The tone "do" can thus be placed at any point on the musical scale for the first ring and the other notes will have their proper numbers of vibrations.

The scale of two octaves can thus be adjusted to any voice, from the lowest bass to the shrillest treble.

There is no need for any sharps or flats to change the scale; that is done by changing the speed. For example, a song written in the key of *c* can at once be transposed to the key of *d* (two sharps) by speeding the motor 25 per cent faster.

The disc can be adjusted to any given note. When a pitch pipe of $c = 256$ is blown into the tube (it is best to remove the mouthpiece), the speed of the motor can be changed till the inner ring remains still. It is then known that 256 spaces per second are passing on the inner ring; the speed of the motor must therefore be 32 revolutions per second; the numbers of spaces for the other rings are readily calculated.

If a tone from any musical instrument is brought into the tube, its pitch can be told by noting

which ring stands still. The same is true of any tone that may be sung. The strobilion can thus be used to give the pitch of any tone that reaches it in a way to make the flame vibrate.

What happens when the number of vibrations of the tone reaching the flame is not exactly identical with the number of spaces passing in any ring? Suppose the disc to be revolving so that 80 spaces of the inner ring pass in one second and that the tone has 79 vibrations a second. Between two flashes the white space will have moved not only to the position of the next space, but also 1/80th further. The result is that the white space, instead of being still, appears to creep slowly forward by 1 80th of the distance between corresponding points on the two spaces. Thus, if the vibrations of the tones are one less per second in number than the number of spaces per second, the ring will appear to move forward by one space per second. It will be readily understood that for a difference of two vibrations it will move two spaces per second, and so on. When the tone has fewer vibrations than the number of passing spaces, the ring appears to move forward; when it has more, the ring moves

backward. It is thus possible to tell, with great accuracy, just how many vibrations lower or higher the tone is than the ring that stands still.

The deaf pupil is told to sing into the mouthpiece. At first he will sing in such a faint or tight voice that nothing happens, or in such a bellow that he blows the flame out. The first lesson may be profitably used to teach him to regulate the power of his voice. Indeed, one of the most valuable uses of the strobilion is to teach proper control of the breath and proper relaxation of the muscles of the larynx and throat in producing voice.

Then he is made to see that a person can make a certain ring stand still by singing into the mouthpiece. When he makes the attempt he sees that the wrong ring stands still. If the disc has to be speeded up to match a shrill falsetto tone, he readily understands that he must sing lower. An important result thus obtained is that the pupil learns the correct register in which to use his voice.

The next step is to sing a tone so that a certain ring remains absolutely still (Fig. 110-A). The pupil feels around with his voice; he sees sometimes one ring stand still, sometimes another. Finally he

hits the desired one. This he repeats over and over till he learns to strike it rightly each time.

A common fault with the pupil is that he starts too low and raises his voice; he is made to notice that he travels over lower rings before reaching the correct one (Fig. 110-B). By watching his teacher he gets the idea that the correct ring must appear instantly without any initial slide.

The next step is to teach the musical intervals. The teacher points to the ring "do"; the pupil must sing the correct note. Then he points to "sol"; the pupil must raise his voice instantly to a note that makes "sol" without passing over any of the other notes (Fig. 110-C). In this way all the intervals of the octave are taught.

The slide, or portamento, is easily taught. After singing "do," the pupil is to pass to "sol" or "do" above by making all the intervening rings flash out as his voice is raised (Fig. 110-E). It is much easier to pass from one note to another by a slide than to jump over the interval clearly. The complete scale (Fig. 110-F), with all of its intervals correct, is ultimately acquired.

It is evident that a whole course of instruction

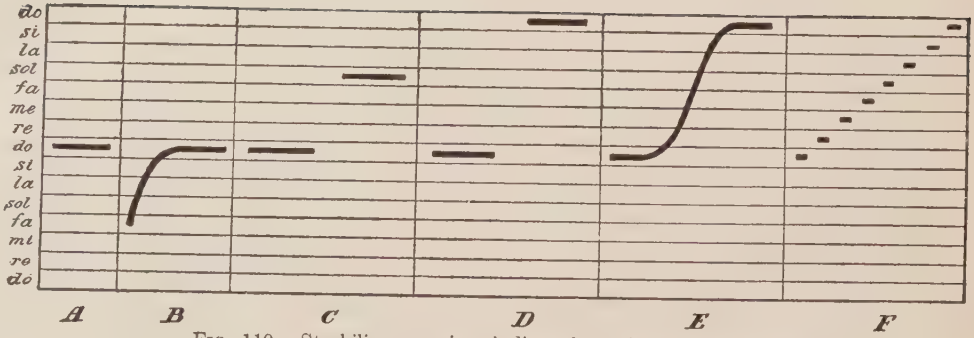


FIG. 110.—Strobilion exercises indicated on the strobilion staff.

A. A constant tone, sung on middle "do."
B. Incorrect beginning for "do."
C. An interval of a fifth.
D. An interval of an octave.
E. A slide, or portamento, over an octave.
F. The scale sung staccato.

in singing can be carried out not only for the deaf, but also for the hearing person. In fact, the apparatus is in use for singers who have difficulty in accurately pitching their voices or in getting intervals.

The purpose, however, is not to make singers of the deaf, but to give them such a control of their vocal cords that they can modulate their tones in speech.

Although the strobilion is somewhat complicated in theory, it is not much more difficult to use than the double-flame trainer previously described. It has the inestimable advantage of the greatest accuracy in controling the voice and of almost innumerable applications.

CHAPTER III

GRAPHIC RECORDS OF SPEECH

THE first extensive researches with graphic records of speech were those of the Abbé Rousselot on one of the French dialects. Many further studies of French and other languages have come from his laboratory of experimental phonetics at the Collège de France. The method is available for the most varied researches on voice and speech in the various languages and dialects, on their modifications by defect and disease, on the peculiarities and troubles of singers, on the correctness of oratorical speech, etc. In short, there is hardly a problem of speech, from correcting a German's mispronunciation of English to the analysis of a maniac's ravings, to which this method has not or cannot be applied with profit. Strangely enough, no attempt has ever been made to apply it to the speech of the deaf.

A sheet of glazed paper is fastened around a metal cylinder and is smoked over a gas flame. The

cylinder is then placed on a clock-work that can revolve it rapidly and regularly. The recording apparatus is shown in use in figure 7, p. 26.

When a record is to be made, the drum is wound up and set in motion. A tuning-fork of 100 vibrations a second is held so that a fine point or bristle on the end of one of the prongs touches the smoked surface. This draws a wavy line, each wave of which measures 1/100th of a second (Fig. 111). The

FIG. 111.—Time line: each vibration measures 1/100th of a second.

speed of the drum is thus always known. The point of the recorder is then placed to the drum. The person speaks the desired words and the recorder is moved away.

The top line of Figure 112 gives a record of "potato," spoken normally. It begins with a straight line, due to the occlusion of the "p" —that is, to the period during which the breath is stopped by the closure of the lips. The sudden movement of the line upward is due to the explosion of the "p" as the lips are opened. The explosion is so sharp that

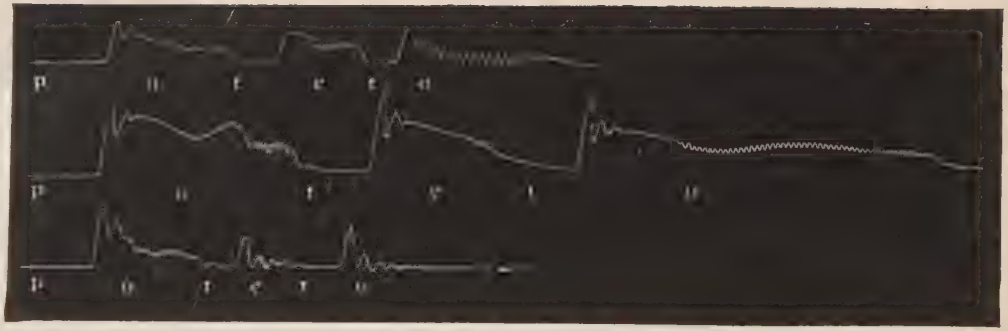


FIG. 112.—Records of "potato," in phonetic notation (poteto).

The small waves are the record of the vibrations of the voice during the vowels. The straight lines show where the breath was cut off by the occlusives "p" and "t." Each occlusion ends in an explosion, shown by the sudden rise of the line with the large vibrations First line: normal record. Second line: record by C. F.: the vowels and the occlusions are too long and the explosions are long and breathy. Third line: spoken by C. F., after comparing his record with the normal one."

the lever makes several large vibrations before it comes to rest. The small waves are a record of the vibrations of the vowel "o." These are suddenly cut short and the line drops for the occlusion of the "t." The "t" has an explosion, but it is not so strong or so sharp as that of the "p." The small waves that follow are a record of the vowel "a." The second "t" has an occlusion somewhat shorter and an explosion somewhat sharper than those of the first "t." The word ends with the vibrations of the vowel "o." In the figure the lettering is in the international phonetic alphabet; the sound of the second vowel is indicated by "e."

The second line of figure 4 gives a record of the same word by C. F. (15 years of age, totally deaf since 7 years of age, under oral instruction for 8 years). We notice in the first place that the word was spoken far too slowly. By applying dividers, or a scale, to the last vowel, "o," we find that it is fully twice as long as it should be. This last fact was explained to C. F., whereupon he made the record shown in the third line of the figure. In the effort to correct his drawl he made the vowels even a little shorter than the normal ones. Comparison

of line 3 with line 2 shows that the explosions of the "p" and the two "t's" were made quickly and snappily instead of breathily, as in line 2.

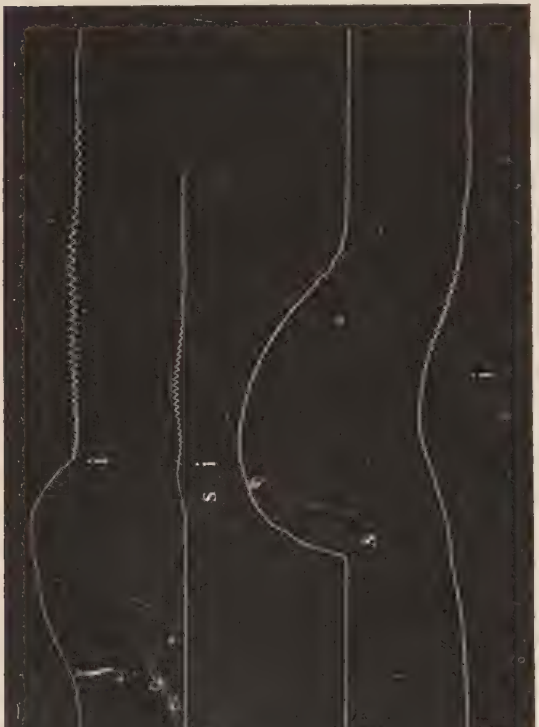


FIG. 113.—Records of "she." First line: record of "she" spoken normally, in phonetic notation (*ši*); during the fricative "sh" the line rises gradually. Second line: record by C. F., which sounded like "t_se" (t_si), with a very brief "s"; the straight line records the long occlusion for the "t"; the normal explosion for "t" (see Fig. 112) is lacking; it is replaced by a weak fricative sound indicated by the slight rise in the line. Third line: C. F. attempts to make "sh" like that in the first line; the result is "ts," the "s" being exaggerated. Fourth line: C. F. pronounces "she" correctly, except for making "sh" a trifle too long.

The same pupil was asked to read from a book. The pronunciation of "she" seemed peculiar. He

was asked to make a record. The result is shown in the second line of figure 113. A normal record was then made (first line of figure 113) and shown to him. He at once understood that he did not emit breath enough for the consonant, so he tried that alone. The result is given in the third line. He had no difficulty in understanding that he had first made an occlusive (namely, "t") and then put a fricative after it instead of producing a fricative alone. A further attempt is shown in the fourth line. The fricative sound is somewhat too long, but otherwise it is correct. One other fault was involved in his pronunciation, namely, the use of "s" for "sh." He first said what sounded like "tse" (tsi). He had made a "t"-sound with an "s"-like explosion. After the record in the third line he was told not to say "s", but "sh." The last line shows that he did this successfully.

The first line of figure 114 shows a normal record of "too much." The occlusion of the "t" and its explosion are followed by the vibrations of the first vowel. The line for the "m" is at the zero level, because the lips are closed and no air issues; there are faint vibrations, because "m" is voiced. The

vowel "oo" is registered by strong vibrations. The line falls suddenly as the tongue closes the mouth-

FIG. 114.—Records of "too much." First line: "too much" (tumʌ́ch), spoken normally. The occlusion and the explosion of "t" are similar to those in Fig. 112. The vibrations of "oo" are followed by the weak vibrations of "m." The strong vibrations of "u" are followed by the occlusion, with long fricative ending of "ch." Second line: record by A. O.; there is no explosion for "t"; the "m" is unvoiced; the word ends with an occlusion, namely, "t" without its explosion. Third line: record by A. O., after learning that in the first line; the initial "t" has an explosion; the "m" is not voiced; the final sound is "t" followed by "sh"; the entire record is exaggerated owing to over-enunciation.

passage for "ch"; it rises and remains up a while for the last part of "ch." We note that the record

of "ch" consists of an occlusion, followed by a breathy sound.

The second line of figure 114 shows a record of "too much" by A. O. (17 years old, totally deaf since birth, under oral instruction for 4 years). The initial "t" had no explosion and the last sound was a simple occlusion, like a "t" without the explosion. The normal record was explained to him. After half an hour's practise he made the record shown in the third line. The initial "t" has a highly exaggerated explosion. For "ch" he has an occlusion, followed by a fricative sound, but the change from the former to the latter is too sudden. This occurred because he used the front-shut instead of the top-shut position of the tongue for the first part of "ch" and also because all his speech movements were nervously exaggerated. The correction of his over-enunciation and of the voiceless "m" (shown by lack of vibrations in the records) was reserved for another occasion.

It was noticed that instead of "How do you do?" A. O. said something that sounded like "How ho hou ho?" The record of the last word, "do," spoken normally, is shown in the top line of figure 115.

The occlusion, the explosion, and the vowel waves are clearly marked. The record of the last word

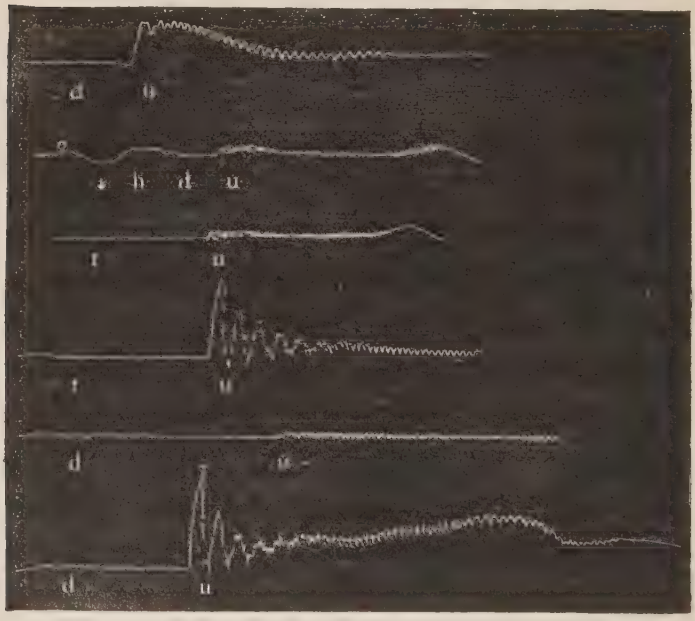


FIG. 115.—Records of "so." First line: "do" (du), spoken normally. Second line: last word of "How do you do?" by A. O.; instead of "d" there are a short inspiration, a short breath, and a short "d," without explosion. Third line: "do," by A. O.; the occlusion lacks vibration (it is unvoiced); it does not end with an explosion. Fourth line: A. O. succeeds in introducing an explosion after the occlusion, but it is still unvoiced. Fifth line: A. O. voices the occlusion, but omits the explosion. Sixth line: A. O. voices the occlusion fairly well; the explosion is too violent.

in the phrase spoken by A. O. is shown in the second line. It shows a brief fall in the line, due to a slight

inspiratory gasp which he was accustomed to make. This is followed by a slight rise in the line that records a short and rather weak "h." The "h" ends in some vibration. The following piece of straight line, with faint vibrations, corresponds to a correctly made occlusion for "d." The record indicates the nature of the boy's mistake. Instead of ending the preceding vowel by closing the tongue against the palate, he inspires through his mouth, blows out a short "h," starts his larynx vibrating, and only after all this does he use his tongue for "d."

The record of normal "do" in the first line was then shown to him. His attempt at this word alone is shown in the third line. The occlusion of the "d" is present, but there are no vibrations and there is no explosion; the sound was rather a "t," with no explosion. The vowel vibrations are correctly made.

It was easy to get him to make an explosion for the "d" (fourth line), and fair success was achieved in introducing voice (fifth line). The best record obtainable in the half hour at disposal is shown in the fifth line. The "d" is not perfectly voiced and its explosion is exaggerated.

This method is of such practical value that it will probably be introduced in many places. In using the apparatus, the recording drum must run so rapidly that the surface of the smoked paper travels at the rate of least 100 millimeters a second. Its speed must be very regular.

To smoke the drum it is removed from its axle and placed on a special support. A sheet of glazed paper, gummed on one end, is placed around the drum. A gas flame is held closely under it while it is turned rapidly.

After a record has been made, the paper is cut off and passed through a pan containing a solution of shellac. The solution of shellac should be so weak that the paper will dry rapidly and not remain sticky, and so strong that when it is dry the black will not come off when rubbed by the thumb.

CHAPTER IV

CORRECTING NASALITY

With a good light shining into the mouth an archway is seen at the back. The broad top part is called the velum, or soft palate. The small ridges at each side are called the pillars of the velum; the small tip hanging down in the middle is the uvula.

When a vowel such as "ah" is made, the velum is drawn back and upward. This closes the passage through the nose. Reference to Plates I, II and III will show for which sounds the nasal passage should be closed. They include all the consonants except the nasals. For the sounds "m, n, ng," the velum is drawn down so that the nasal passage is fully open (Plate II.)

Any improper or unusual action of the velum changes the sounds. If the velum is dropped during a vowel it becomes "nasal"; this is frequently the case in the speech of Americans.

The proper use of the velum is one of the points in the instruction of the deaf. The passage of air and sound through the nose can be shown by

FIG. 116.—Tambour indicator.
The glass nasal tip is inserted in a nostril. Whenever air passes through the nose the light lever on the tambour moves.

the familiar methods of holding nose with the fingers, by holding a mirror before the nose, etc. Two convenient forms of nasal indicators are shown

in Figures 43 and 89. The candle indicator (Fig. 42) can likewise be made available by using the nasal tip as in Fig. 43. The tambour indicator (Fig. 116) is the most convenient of all. It is possible that the velum hook (Figs. 90, 91) may be of use for the deaf; I have not tried it.

The graphic method can be introduced by adding a point to the tambour so that it will write on the recording drum (Fig. 86). It is still better to use the speech recorder (Fig. 7) in connection with the nasal recorder, as in Fig. 117. The lower line records the speech as it leaves the mouth; the upper line records the passage of air through the nose. Such a nose and mouth record of "thinking" is shown in Fig. 118. The lower line has a sharp rise that registers the air issuing from the mouth for "th." Then follow the waves of the vowel. The line sinks to the horizontal and remains so for "n": small waves can be seen. The horizontal line continues without waves for "k." This ends in an upward jerk for the explosion of "k." After the waves for "i" the line is again horizontal wth faint waves for "ng." The upper or nasal line does not move during "th." Then it rises rapidly

FIG. 117.—Making nose and mouth records.
A recording tambour of the type shown in Fig. 116 is placed above a mouth recorder so that both records are made simultaneously

FIG. 118.—Nose and mouth record of "thinking."
For the sounds "n" and "ng" the nasal line rises as always. It also rises for both the vowels because they precede nasal sounds.

with strong waves during "i." Ordinarily "i" has no emission of air through the nose, but before a nasal sound (m, n, ng) it is regularly nasalized, as in this case. A strong current of air is shown for "n." The sudden descent of the line indicates the closing of the nasal passage for "k." Again the rise of the nasal line shows that "i" is nasalized before the following nasal. The "ng" is strongly nasalized.

The deaf often nasalize improperly. It was observed that one deaf pupil nasalized "so" in some way. A double record was made, with the result shown in the lower part of Fig. 119. A normal record was then made, as in the top part of this figure. It was pointed out to the pupil in the first place that his word was entirely too long (a piece has been left out in the figure). Then it was pointed out that a vast amount of air issued from his nose during "s" instead of none at all. The flatness of the mouth record for "s" in his case needed no comment; it was simply the result of the open nasal passage. The vowel was also entirely nasalized. After a few trials he was able to speak the word correctly.

FIG. 119.—Nose and mouth records of "so."

The first record is by a normal voice. The mouth record (lower line) shows the rush of air for "s" followed by the vibrations of the vowel. The nasal record (upper line) shows no emission of air from the nose till the word has been finished. The second record is by a deaf child; a portion from the middle is omitted. The air for the "s" issues almost entirely through the nose instead of the mouth.

FIG. 120.—Nose and mouth records of "speak."
The "s," "p," "i" and "k" in the lower record are improperly nasalized.

A girl 15 years old, totally deaf from birth, was observed to produce some kind of nasality in the word "speak." A double record (lower part of Fig. 120) showed that she improperly nasalized the entire word except "p." A normal record was shown her (upper part of figure). After an astonishingly brief practice she learned to speak the word correctly.

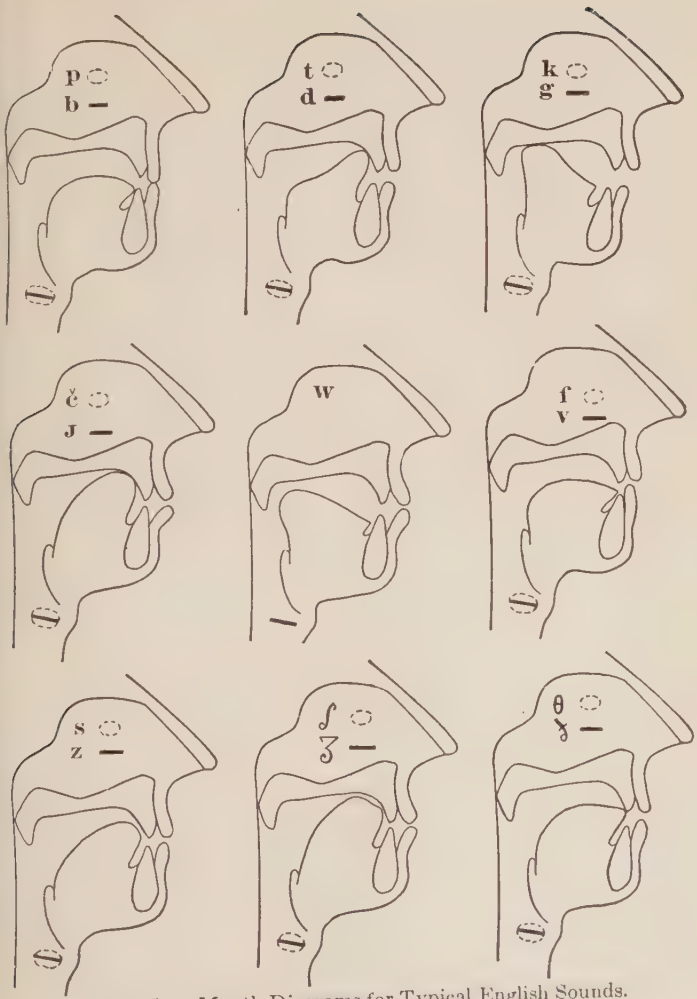


PLATE I. — Mouth Diagrams for Typical English Sounds.

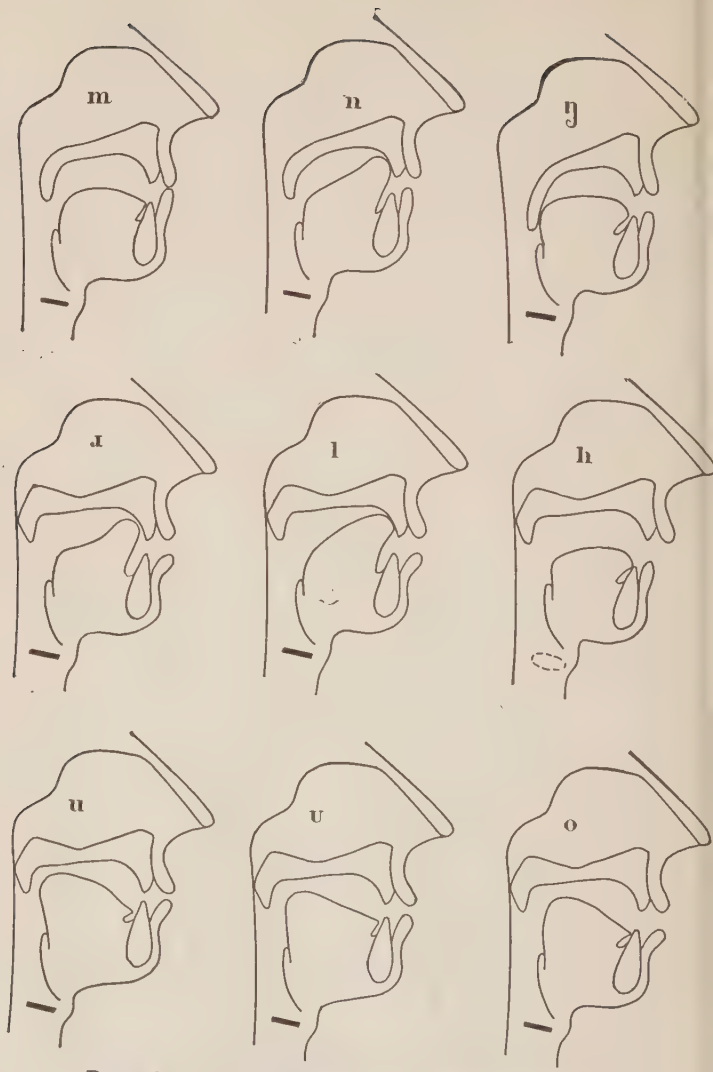


PLATE II. — Mouth Diagrams for Typical English Sounds

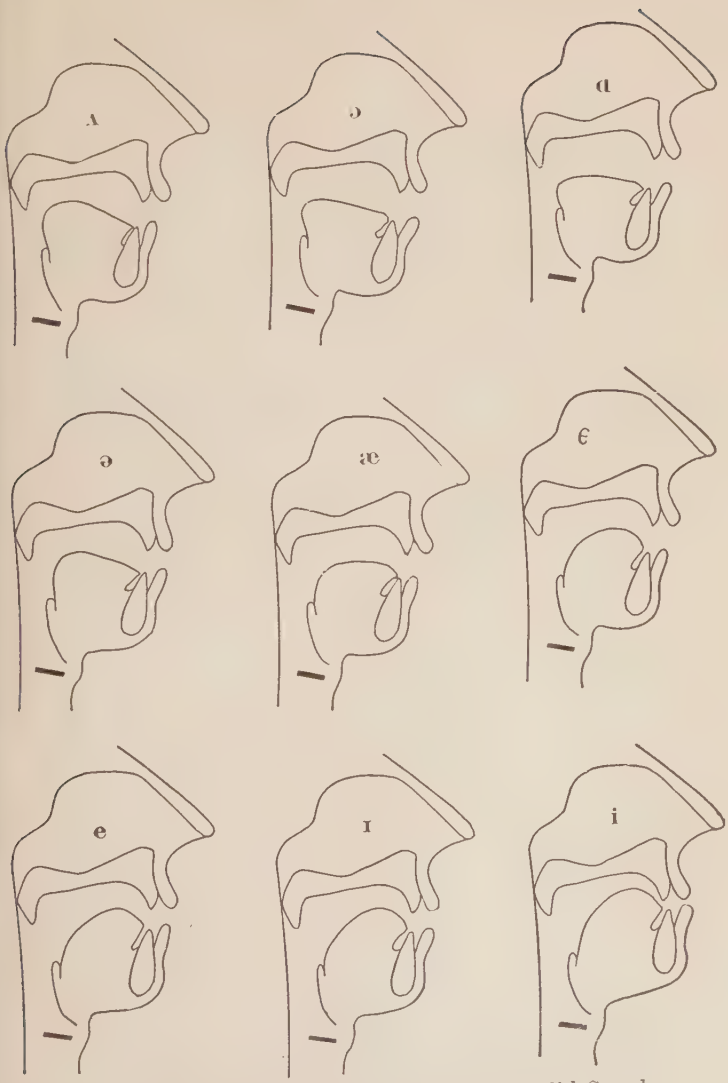


PLATE III. — Mouth Diagrams for Typical English Sounds

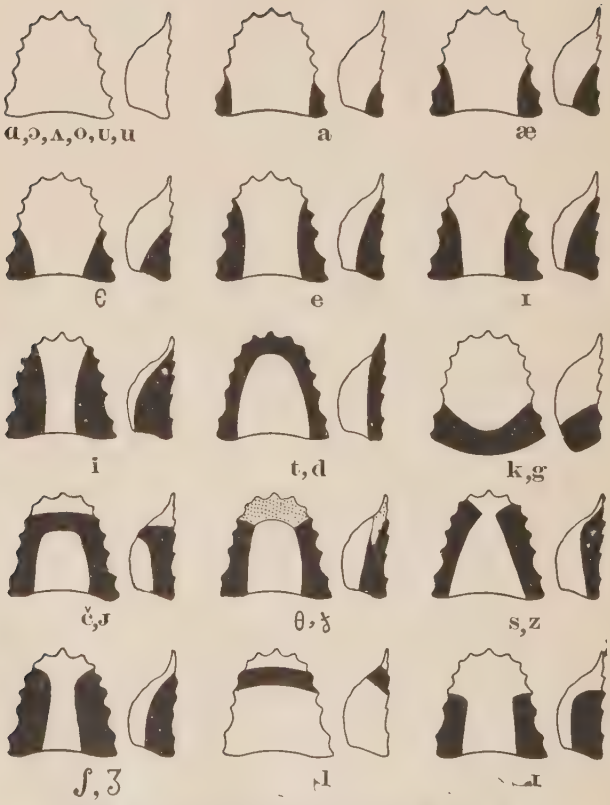


PLATE IV.—Palatograms for Typical English Sounds

INDEX

Abdominal movements recorded, 24.
Adenoids, 170.
Akromegaly, 165.
Anxiety neurosis, 7.
Aphonia, hysterical, 49.
Argument, 223.
Artificial palate, 115.
Association of ideas, 87, 217.

Belief in success, 66.
Breath indicator, 118, 153.
Breathing, 84, 190.
Breathy voice, 81.
Bulbar paralysis, 52.
Business, 223.
Buying, 212.

Candle flame indicator, 117.
Censorship, 100.
Character in stuttering, 20.
Chest movements recorded, 22.
Choreatic stuttering, 47.
Class work, 72.
Clear endings, 28.
Cleft palate, 168.
Clinic treatment, 72.
Cluttering, 46, 187.
Colds, 171.
Collection of ideas, 216.
Compulsive act, 37.
Confidence, 13, 90, 210.
Contagiousness of stuttering, 7.
Continued story, 212.
Control of the voice by ear, 196.
Conversation, 222.
Coolness in argument, 223.
Correct enunciation, 65.
Correct thinking, 64.
Correction of character, 66.
Coup de glotte, *see* Glottal catch.
Cramps in stuttering, 10.
Deaf, methods of correcting speech, 244.
Defective enunciation, *see* Lisping.
Defective hearing, 171.
Deflected septum, 170.
Denasalization, 170.
Description, 219.
Diagnosis of stuttering, 42.
Disease as a cause of stuttering, 8.
Dreams, 103.
Drum, 23.

Embarrassment, 3, 15, 17, 217.
Emphasis, 208.
Emphasizing periods, 206.
Ending, 205.
Enunciation, 88, 207.
Equilibration of character, 63.
Exercises, 69, 190.
Exhaustion as a cause of stuttering, 8, 16.
Experimental phonetics, 22.
Explosives, 117.
Expression, 208.

Flamebox, 245.
Fear as a cause of stuttering, 6.
Feeble lips, 162.
Fixation of the larynx, 226.
Flame indicator, 119.
Flexibility, 74, 197.
Flurry, 14.
Forms of stuttering, 15.
Freud, 7, 67.
Fricatives, 117.
Fright stage of stuttering, 118.
Functional lisping, 123.

Gas capsule, 245.
General anxiety neurosis, 7.

General conversation, 222.
General indistinctness, 157.
General paralysis, 54.
Glottal catch, 81.
Graphic records, *see* Records.

Habit formation, 61.
Habit stage of stuttering, 15.
Hare lip, 162.
Hemiatrophy of the tongue, 163.
Hereditary ataxia, 52.
High palatal arch, 167.
Hoarse voice, 81.
Hoarseness, 81.
Home, the stutterer at, 4, 57.
Husky tone, 204.
Hyperphonia, 12.
Hypertonicity, 12.
Hysteria, 48.
Hysterical aphonia, 49.
Hysterical mutism, 48.

Ideas, collection of, 216.
Imitation as a cause of stuttering, 7.
Increasing embarrassment, 62.
Indifferent stage in stuttering, 19.
Infantile cerebral palsy, 49
Insanity, 55.
Institutional treatment, 71.
Intellectual disturbance in stuttering, 65, 119.
Introducing, 213.

Jaw defects, 165.
Jaw position, 227.

Kussmaul, 34, 52.

Laryngeal tone, 11, 23, 74, 244.
Larynx, fixation of, 226.
Larynx defects, 155.
Lengthened vowels, 199.
Linking, 201.
Lip defects, 124.
Lip gymnastics, 163, 226.
Lip movements recorded, 25.
Lip reading, 172.
Lips in connection with lisping, 162.
Lisping, as a cause of stuttering, 17, 164; defined, 111; negligent, 122; organic, 162; neurotic, 173.
Loudness of voice, 98.
Lowering tones at end, 206.

Marometric capsule, 245.
Megaphone, 204.
Melody, 74, 194.
Melody cure, 77.
Melody plot, 33.
Mental cramp, 97.
Mental daze, *see* Intellectual disturbance.
Mental flurry, 14.
Metronome, 200.
Monotony, 11, 33.
Motor aphasia, 50.
Mouth recorder, 25.
Multiple sclerosis, 52.
Muscular action, defects of, 83.
Muscular control, 225.
Muscular dystrophy, 163.
Mutism, hysterical, 48.

Nasality 150; of the deaf, 273.
Nasals, 118.
Nature of stuttering, 34.
Negligent lisping, 43, 112.
Neurotic lisping, 145, 173.
New method of speaking, 57.

Occlusives, 117.
Octave twist, 78, 192.
Office treatment, 67.
Operation as a cause of stuttering, 6.
Organic lisping, 43, 162.
Organs of enunciation and phonation, 113.
Organ trainer, 246.
Overshot jaw, 165.
Overtension in stuttering, 12.

Palatal arch, 227.
Palate defects, 167, 168, 170.
Palatography, 114.
Penmanship stuttering, 38.
Periods, 206.
Phobia, 38.

Phonetic alphabet, 112.
Phonetics, 22.
Pneumograph, 22.
Principles for treating stuttering, 57.
Progressive bulbar paralysis, 52.
Prophylaxis of stuttering, 8.
Pseudobulbar paralysis, 53.
Psychanalysis, 67, 69, 101.
Psychoneurosis, stuttering as a form of, 7.
Public speaking, 214.

Quality of voice, 81.

Reading, 94, 192.
Reading together, 210.
Reading with decided voice, 211.
Readjusting the subconscious, 100.
Readjustment of environment, 98.
Rear palatal arch, 227.
Recording drum, 23.
Recording tambour, 22.
Records, of breathing, 22; of pressure of the lips, 23; of movements of the tongue, 24; of speech, 26-32; of speech in nerve diseases, 50-53; of speech to show octave twist, 72-79; of glottal catch, 82; of speech in stuttering, 23, 24, 25, 28, 30, 31, 32, 89; of lisping, 132; of "ch" and "tsh," 136; of "r," 144, 145, 146; of nasal currents and vibrations, 151, 152; of laryngeal incorrectness, 156, 157; of "apa," 158; of neurotic lisping, 178-179; of speech of the deaf, 262; of nasality in the deaf, 275.
References, 245.
Relation, 220.
Relaxation, 61, 224.
Relaxed palate, 170.
Relaxing the jaw, 226.
Revolving mirror, 276.
Running associations, 104, 109, 219.

School, the stutterer at, 3.
School work, 215.
Sentences for indistinctness, 159.
Septum, 170.
Shock as a cause of stuttering, 6, 16.
Singing, 90, 91, 192, 197.
Slowness, 85, 198.
Smoothness, 201.
Social timidity, 39.
Sonants, 118.
Spasms in stuttering, 10.
Spastic speech, 49.
Speaking, 92, 193, 198, 224.
Speaking together, 211.
Speaking with confidence, 211.
Speech clinic, 72.
Spelling, 208.
Spontaneous speech, 94, 216.
Stages of stuttering, 15.
Stammering, 44.
Starting, 201, 205.
Statement and question exercise, 193.
Statistics of stuttering, 9.
Stekel, 62.
Strengthening first word, 205.
Strobilion, 252.
Stuttering, description, 1; detriment to welfare, 2; at school, 3; at home, 4; a disease, 4; regarded as a habit, 5; causes, 5; connected with nervousness, 6; contagiousness, 7; after exhaustive diseases, 8; prophylaxis, 8; statistics, 9; symptoms, 10; forms or stages of, 15; habit stage, 15; fright stage, 18; indifferent stage, 20; connection with character, 20; experimental study of, 22; nature of, 34; Kussmaul's theory, 34; relation to other neuroses, 37; author's theory, 38; differential diagnosis, 42; therapy, 56.
Subconscious, 70.
Subconscious readjustment, 67.

Talking with people, 222.
Tambour, 22.
Tambour indicator, 121.
Technical terms, 246.

Telephoning, 96, 221.
Theory of stuttering, 36.
Therapy of stuttering, 56.
Thinking, 86, 217.
Tic, 37.
Tic speech, 47.
Tissue paper indicator, 153.
Tone of voice, *see* Laryngeal tone.
Tone placing, 202.
Tongue defects, 163.
Tongue gymnastics, 160, 225.
Tongue movements recorded, 25.
Tongue-tie, 18, 43, 164.
Tooth defects, 165.
Transacting business, 223.
Trumpet, 204.
Turbinates, 170.

Undershot jaw, 165.

Velar hook, 153.
Velum defects, 150, 168.
Vocal quality, 81, 202.
Voice tone, *see* Laryngeal tone.
Vowels, 116.

Word lists, 228.
Writer's cramp, 38.

4 2 1 WIS. B AUG '64

APR 12 1989

MAY 3 - 1993

MAR 22 1994

SEP 16 1999

DEC 11 2002

RC424.S4 1923
Stuttering, lisping and correction of th
WITHDRAWN
3 0629 0074895 4

RC
424
S4
1923